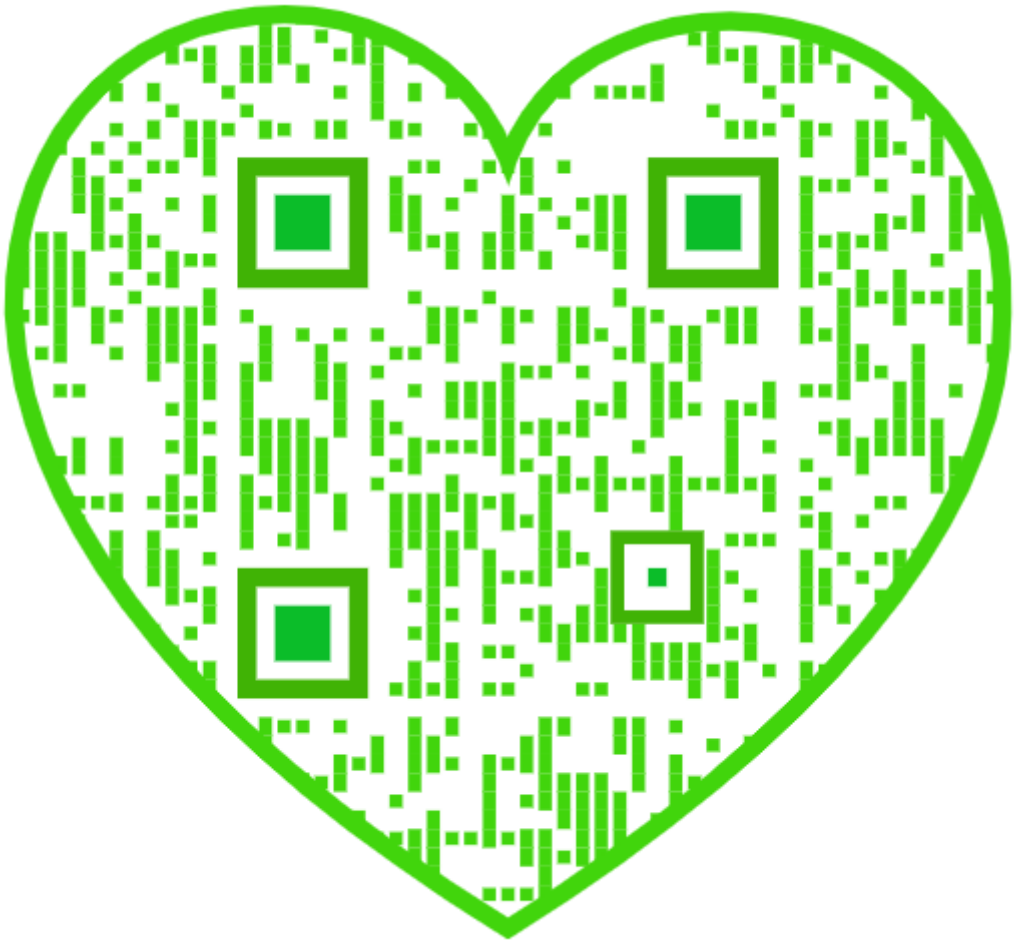

ANIMAL PLAGUES:

THEIR

HISTORY, NATURE, AND PREVENTION.

BY

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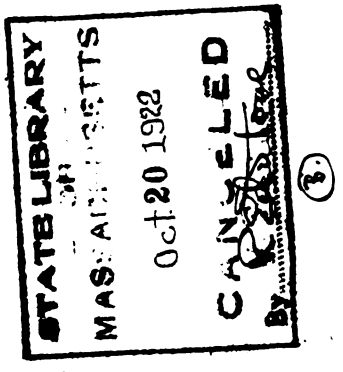

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TO

His Excellency Earl Spencer, K.G.

LORD-LIEUTENANT OF IRELAND,

THIS WORK IS

DEDICATED IN RECOGNITION OF HIS IMPORTANT SERVICES

DURING A GRAVE CRISIS IN THE AGRICULTURAL

AND COMMERCIAL HISTORY OF

GREAT BRITAIN.

Non tam creber agens hiemen ruit æquore turbo,
Quam multæ pecudum pestes. Nec singula morbi
Corpora corripiunt, sed tota æstiva repente
Spemque gregemque simul, cunctamque ab origine gentum.

VIRGIL. *Georgics*, lib. iii. 470.

Non est in medico semper relevetur ut æger;
Interdum doctâ plus valet arte malum.—OVID.

To be ignorant of what has occurred before our time, is ever to remain in a state of childhood.—CICERO.

PREFACE.

For very many years the subject of 'Animal Plagues' has occupied a large share of my attention during the hours spared from more pressing every-day professional duties, and no opportunity of adding to a knowledge of it has been allowed to pass. Since 1865, when this country was much harassed and ravaged by a destructive exotic disease, its importance has greatly increased, and public attention has been much occupied by it. Previous to that year, the maladies of the lower animals, and particularly those of a contagious or spreading character, had received but little if any notice, save among a few members of the veterinary profession, who vainly attempted to point out their dangerous tendencies, and their baneful effects on the agriculture of the country, as well as their amenableness to legislative measures carefully carried out. The striking facts elucidated in this respect in 1865 and 1866, have corroborated, in every particular, the justness and value of these unheeded indications. It is scarcely necessary to say, that had the history of the malady then raging been better known, serious loss and embarrassment might have been avoided, and more credit would have been due to us as an enlightened people.

The science of Comparative Pathology has made but little progress in this country; it has not been looked upon with much favour by the medical profession, and has been neglected altogether by successive

Governments. In this respect Britain differs widely, and not to her advantage, from the smallest European state.

These researches into the history of animal pestilences were undertaken with the view of showing what an interesting and important study we had neglected,—a study in which the comparative pathologist, physician, general historian, agriculturist, or statesman will find much material for reflection.

Though so long ago as 1775, Paulet published his classical work, 'Recherches sur les Maladies Epizoötiques,' which was translated into Italian by Lotti in 1785, and into German by Rumpelt in 1776; and though this was followed by similar treatises by Adami ('Beiträge zur Geschichte der Viehseuchen.' Wien, 1781), Laubender ('Seuchengeschichte der Landwirhschaftlichen Hausthiere.' München, 1811), Guersent ('Epizoötie,' in the Dictionnaire des Sciences Médicales, 1815), Metaxa ('Delle Malattie Contagiose ed Epizoötiche. Roma, 1817), Dupuy ('Traité Historique et Pratique sur les Maladies Epizoötiques.' Paris, 1837), Bottani ('Delle Epizoözie del Veneto Dominio.' Venezia, 1819), Franque ('Geschichte der Hausthierseuchen.' Frankfort, 1834), Wirth ('Lehrbuch der Seuchen und ansteckenden Krankheiten der Hausthiere.' Zürich, 1146), Heusinger ('Recherches de Pathologie Comparée.' Cassel, 1853), and several other continental writers—all more or less incomplete,—yet, for the reasons before mentioned, no attempt has yet been made in this country to trace the history of these diseases, or to afford an indication of the sources from whence such a history was to be derived. It is therefore with diffidence that I venture to offer this history of British and foreign epizoöties from the earliest recorded events of that kind up to recent times. For professional reasons, my opportunities for research have been few, else this contribution to the literature of the subject would undoubtedly have claimed more pretensions to accuracy and completeness. Nevertheless, no pains have been spared to make it what I intended it should be. The collection of materials for such a work was no easy task, the references to animal diseases of a general character in the early ages being only found in books which treat also of other matters, and are often very rare. From these and other causes I feel conscious that the result of my labours must be somewhat incomplete and unsatisfactory.

When possible, I have given translations of the passages in the several histories, following the *ipsissima verba* as closely as the sense would permit; when the descriptions have proved too long for complete transcription, a brief abstract has been made; and when, at a later period, writings become greatly multiplied, an enumeration of the principal authors and the titles of their books has been given, in addition to a notice of the special maladies they have described. In this respect, Heusinger's excellent work has proved an invaluable source of reference.[1]

I have always been impressed with the idea that a history of many of the 'murrains' that have travelled across countries, often in company with or preceding human pestilences, would prove a most valuable aid to the student of comparative pathology, and be of service to the busy practitioner whose leisure is more limited; while to the physician, agriculturist, or statesman it might serve as a guide for reference whenever the diseases of animals shall occupy a larger share of scientific and public interest than at present. Acting on this impulse, the task was commenced, and nothing but the importance and interest that appeared to gather round it as I proceeded could have compensated for the labour required. Unsatisfactory as the result now appears to me, yet I trust it will be found acceptable and useful to those for whom it was written, as a treatise on a subject of national importance.

In considering the extent and the many difficulties attending such a work, I may say in the words of Pliny, quoted by Paulet, 'Res ardua, vetustis novitatem dare, novis autoritatem, ... obscuris lucem, fastiditis gratiam, dubiis fidem, omnibus verò naturam et natura suæ omnia.'

[1] In addition to this and the other works mentioned above, the following also treat of epizoötic diseases, though generally in a didactic manner, and are seldom, if at all, noticed in the body of this treatise. *Wollstein.* Das Buch von den Viehseuchen. Wien, 1811. *Werner.* Handbuch von den Seuchen des Viehs. Breslau, 1798. *Bojanus.* Anleitung zur Kenntniss und Behandlung der wichtigsten Seuchen unter dem Rindvieh und Pferden. Wilna, 1830. *Plank.* Grundriss der Epizoonologie oder Thierseuchenlehre. München, 1833.

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INTRODUCTION.

WHEN a nation has passed from a savage or semi-savage condition—from that of the hunter or fisherman, caring but little for anything beyond what may be sufficient for the brief but precarious maintenance which is found in the chase—to the more civilized and civilizing state of a pastoral people, a great change is manifested in its character. The most noteworthy feature in this transformation is the high value that begins to be attached to those animals which, in the former stage of civilization, were pursued and destroyed in a wild state, but have now by kindness, and other means founded on motives of economy, become domesticated and soon form the wealth and well-being of their owners. From them the pastoral people derive their subsistence, in the form of food and clothing; and on them they rely for most essential services during life. In return, the welfare of these animals is carefully studied; their increase in number and in individual value is a matter of social as well as political importance; but the experience necessary for this successful increase and amelioration can only be acquired by long and close observation, the needful training for which exalts and expands the human mind.

Wandering with their flocks and herds to new pastures, when impelled by the seasons, by the multiplication of tribes and families, or by changes of a terrestrial character, these nomads, ever seeking for the prosperity and safety of the animals on which they depended for existence, were, in prehistoric times, the pioneers of civilization. Their dumb companions in these pilgrimages became, as it were, a

portion of their national life, and exercised no small influence on their moral and intellectual development—on their religion, manners, and customs; this influence even extending itself to the language, the poetry, and the arts of these primitive shepherds.

The immense Steppes of Central Asia still furnish us with examples of this condition of the unsettled races who wander over them with their countless herds and flocks; and a recent traveller[1] in that region of the world pleasantly describes some of the scenes he witnessed among them. 'Just as the day dawned I turned out to examine our position, when I discovered the snowy peaks of the Syan-Shan. They appeared cold and ghost-like against the deep blue sky; presently they were tipped with the sun's rays, and shone forth like rubies. I sat on the ground watching the changes with much interest, till the whole landscape was lighted up. Immediately near me was a busy scene—on one side the men were milking the mares, to the number of more than one hundred, and carrying the leathern pails of milk to the "Koumis" bag in the "yourt;" the young foals being secured in two long lines to pegs driven into the ground. In front, and on the opposite side, the women were milking cows, sheep, and goats, and at a little distance beyond these the camels were suckling their young. Around the "aoul" (camp) the Steppe was filled with animal life. The sultan told me that there were more than two thousand horses, half the number of cows and oxen, two hundred and eighty camels, and more than six thousand sheep and goats. The screams of the camels, the bellowing of the bulls, the neighing of horses, and the bleating of sheep and goats, formed a pastoral chorus such as I had never heard in Europe.' On another occasion he writes: 'All were out with the dawn, and then commenced a scene in pastoral life highly interesting to me. I had left the "yourt" (tent), and looked around in every direction, but beheld only a mass of living animals. The whole of the herds are brought to the aoul at night, where they are most carefully guarded by watchmen and dogs placed in every direction, rendering it almost impossible to enter any aoul without detection. In my childhood I lived in localities where there were many horses and cattle, and used to think a flock of five or six hundred sheep a large one; but was now astonished by the numbers before and around me. The noise at first was almost intolerable—there was the sharp cry of the camels, the neighing of the horses, the bellowing of the bulls, the bleating of the sheep and goats, the barking of the dogs, and the shouting of the men,

[1] *Atkinson.* Oriental and Western Siberia, p. 497.

—a very Babel. I counted one hundred and six camels, including their young; there were more than two thousand horses, one thousand oxen and cows, and six thousand sheep and goats. Even these, large as the number may appear, were far short of the total number of animals belonging to the patriarch chief: he had two other aouls, at each of which were one thousand horses and other cattle. Women were busy milking the cows, and the men were preparing to drive these vast herds to their pastures. The horses and camels are driven to the greatest distance—as much as ten and fifteen versts—the oxen come next, and the sheep remain nearest the aoul; but these ramble five or six versts away. It was, indeed, a wonderful sight when they were marched off in different directions, spreading themselves out in living streams, as they moved slowly along the Steppe.' [1]

Such is man in a pastoral condition. But when a suitable and propitious locality has been found for their animals, the wanderers perhaps become a settled people, and till the ground for themselves while still attending to the herds; and this combination of pursuits, which we term Agriculture, generally ensures a progressive and prosperous civilization. Humboldt,[2] speaking of the Steppes or Llanos of the New World, thus philosophically demonstrates the influence of the larger domesticated animals on civilization and social progress: 'The Llanos separate the chain of the coast of Caraccas and the Andes of New Granada from the region of forests; from that woody region of the Orinoco which, from the first discovery of America, has been inhabited by nations more rude, and further removed from civilization, than the inhabitants of the coast, and still more than the mountaineers of the Cordilleras. The Steppes, however, were no more heretofore the rampart of civilization than they are now the ramparts of the liberty of the hordes that live in the forests. They have not hindered the nations of the lower Orinoco from going up the little rivers and making excursions to the north and the west. If, according to the various distribution of animals on the globe, the pastoral life could have existed in the New World,—if, before the arrival of the Spaniards, the Llanos and the Pampas had been filled with those numerous herds of cows and horses that graze there, Columbus would have found the human race in a state quite different. Pastoral nations living on milk and cheese, real nomad races, would have spread themselves over those vast plains which communicate with each other. They would have been seen at the period of great droughts,

[1] Ibid., p. 289.

[2] Travels in the Equinoctial Regions of America, vol. ii. p. 98.

and even at that of inundations, fighting for the possession of pastures; subjugating one another mutually; and, united by the common tie of manners, language, and worship, they would have risen to that state of semi-civilization which we observe with surprise in the nations of the Mongol and Tartar race. America would then, like the centre of Asia, have had its conquerors, who, ascending from the plains to the table-lands of the Cordilleras, and abandoning a wandering life, would have subdued the civilized nations of Peru and New Granada, overturned the throne of the Incas and of the Zaque (the secular chief of Cundinamarca), and substituted for the despotism which is the fruit of theocracy, that despotism which arises from the patriarchal government of a pastoral people. In the New World the human race has not experienced these great moral and political changes, because the Steppes, though more fertile than those of Asia, have remained without herds; because none of the animals that furnish milk in abundance are natives of the plains of South America; and because, in the progressive unfolding of American civilization, the intermediate link is wanting that connects the hunting with the agricultural nations.'

The primitive herdsman or agriculturist would soon discover that the domestication of animals sometimes entailed great sacrifices. While watching his stars and his gods for favourable omens, diseases unknown to him when the creatures were in a wild state, would appear; and from their unusual character, the suddenness of their attack, and the great mortality attending them, would strike him with fear and amazement. In his sombre and crude belief in the agency of good and evil spirits, and in his ignorance of the influence of physical phenomena on health, he would only see in these visitations the operation of malignant divinities. All barbarous and ignorant nations have ever substituted for the simple and universal laws of nature, which are unknown to them, the operation of spirits, genii, and strange gods. And when the benignant spirits have been made subordinate to those of a malevolent character, and his cattle decline and die, the half civilized man betakes himself to prayers, sacrifices, imprecations, and other rites to avert the loss and assuage his fears. At a more advanced stage he has recourse to magic to obtain a cure; the animal and vegetable, more rarely the mineral, kingdoms are ransacked; sorcery, enchantments, incantations, and other unreasonable and unhallowed rituals are devised to appease the wrath of the invisible destroyer; and while the potion is being prepared or administered, the mystic formula is uttered in a weird imploring voice to the offended spirit.

Among all people this has been the commencement of what we

may term veterinary medicine; and even in recent times traces of this infantile belief have not been effaced from the customs of the most civilized nations of Europe. The Egyptians, Greeks, Romans, Teutons, Celts, and other nations—pastoral and agricultural—all resorted to polytheism and the kindred belief in incantations and magic for the cure of diseases. History often tells us how these dismal rites were carried out. With half-civilized communities at the present day, we have glimpses of these fantastic notions.

My friend, Mr Michie,[1] tells us of a Mongol superstition, to the practice of which he was a witness. 'As a preventive against cattle being killed by lightning, a horse is devoted to the god of thunder—light grey or white being preferred. He is brought to the door of his owner's tent, and while the Shaman ceremonies are going on, a cup of milk is placed on his back. When the ceremonies are concluded, the horse is cast loose, the milk falls, and the animal is thenceforth sacred. No one may use him again, and, when he dies, his tail and mane are cut off and twisted into those of another horse, which, from that time, also becomes sacred to the god of thunder.'

But with advancing civilization and a higher development of the intellectual faculties, induced by favourable circumstances, the mind would begin to be disenthralled from the depressing influence of mysticism and impotent idolatry; the benign or malign effects of physical agencies on the domestic animals would at first be almost inappreciably though certainly noted, and the skill of the age invoked to bring them more under the influence of the first and beyond the power of the second; while the measures adopted would often be, to a certain extent, aided by the instincts of the creatures themselves, who would naturally shun that which did them harm, and seek for those things which nature indicated as best for them. Their guardians would not be slow in attending to these indications, and in this way would veterinary medicine receive its fundamental empirical teachings. Reason, the divine attribute of the human mind, thus prompted and directed by economic principles, and by that restless, resistless curiosity which seems to seize it whenever it has succeeded in emerging a certain distance from the obscurity of ignorance, would next exert itself to learn the connection between cause and effect; the phenomena of nature and of life would engage the earliest efforts of a dawning philosophy; and the actions and re-actions ever taking place between agencies external to the body and those operating within it, would lead to the

[1] Overland Route from Peking to St Petersburg. London, 1864. P. 200.

investigation of the causes of disease, and to their possible discovery in the organs or tissues of the stricken creatures.

In this manner may the science of medicine—human and comparative—have been begun, and the rudiments of its several branches been slowly but surely acquired. Hippocrates and many of the early physicians obtained their knowledge of anatomy only from the dissection of animals, and these men were the founders of modern as well as ancient medical knowledge. 'Choose an ape for dissection,' says Rufus, who lived about the time of Trajan, 'if you have one; if not, take a bear; and if you have not a bear, take any animal you can get.'

The religious rites pertaining to auguries sought for in the entrails of animals; the examination of their bodies to discover whether, as food, they were pure or impure; and the offerings of portions of immolated creatures to their deities, were all aiding in this work, and offering grand opportunities for observation, notwithstanding the superstitions and impostures of the priests who officiated.

When the nomad saw that the pestilence among his flocks either preceded, accompanied, or was followed by another equally fatal to his own species, we cannot wonder that appeals and sacrifices were made to the supposed authors of such appalling destruction. In a comparatively late era, when a beautiful mythology had sprung up among the Greeks, and when epidemies and epizoöties appeared nearly always to accompany each other, this was more particularly observable. Apollo, who presided over flocks and herds, showered his arrows among them when displeased, and slew men and beasts alike by his vengeful but unseen darts. Homer speaks of the plague which prostrated the Greek camp at the siege of Troy, and ascribes it to the wrath of that deity, who was offended by an insult offered to Chryses, his high priest. But though deep-rooted superstition was fain to impose on the gentle god the blame of the hurtful visitation, the great poet does not forget to indicate a powerful auxiliary to the god's malevolence in the filth lying about the camp, and introduces Agamemnon who orders it to be thrown into the sea. This, if the first recorded step in sanitary reform, is certainly a notable one, and shows the inclination, even in those distant days, to break through the barriers of ignorance and credulity, by seeking out and removing the real causes of pestilential diseases.

In imperial Rome, so often the seat of fearful plagues, superstition played a prominent part, and during the prevalence of epidemic or epizoötic disorders, the Senate had recourse to the Sibylline books and lectisternium to appease the ire of the enraged gods. And the Sallii,

or priests of Mars, were not slow in procuring for themselves greater favours in attributing the abatement of pestilence to their manipulation of, and devotion to, the sacred shields. The true nature of the malady, or its predisposing or exciting causes, were seldom the subject for investigation. 'Pestis et ira Deûm Stygiis sese extulit' was generally sufficient to account for its presence among them. Sacrifices, idolatrous prayers, and implicit faith in what the soothsayers or priests thought fit to teach, mark the history of these inflictions in early times. The terror and desperation induced by such a calamity as a plague is well illustrated in the instance cited by Baronius, in which we are told that a visitation of this kind raged with such fury at Carthage, that parents sacrificed their children to appease the gods.

In our own country many superstitious customs, having reference to the preservation of the domestic animals, appear to have been derived from the early traders with Britain—the Phœnicians. Some of these rites, if they do not now exist, were at any rate in vogue at no very distant date. The worship of Baal, Bel, or Belus, the son of Nimrod, was a Phœnician rite. Fires were set blazing for him at certain times of the year, and if the object of their supplications demanded it, human beings were offered as a sacrifice; but on ordinary and later occasions, the person or animal for whom protection was entreated, rushed, or was driven rapidly through the flames. In the Highlands of Scotland, so late as the middle of the last century, the remains of this gross superstition were noted by Pennant. 'On the first of May, the herdsmen of every village in the Highlands hold their *Bel-tien*, or rural sacrifice. They cut a square trench in the ground, leaving the turf in the middle; on that they make a large fire, on which they dress eggs, butter, oatmeal, and milk, and bring, besides, the ingredients for the caudle, plenty of beer and whisky, for each of the company must contribute something. The rites begin by pouring some of the caudle on the ground by way of libation, on which every one takes a cake of oatmeal, with nine square knobs raised upon it, each dedicated to some particular being, the supposed preserver of their flocks and herds, or to some particular animal, the real destroyer of them. Each person then turns his face to the fire, breaks off a knob, and flings it over his shoulder, saying, 'This I give to thee! preserve thou my horses; this to thee! preserve thou my sheep;' and so on. After that they use the same ceremony to the noxious animals. 'This I give to thee, oh fox, spare thou my lambs; this to thee, oh eagle; this to thee, oh hooded crow!'

'When the ceremony is over, they dine on the caudle.'[1]

In Ireland 'Bel-tien,' according to Macpherson,[2] is celebrated on the 21st of June at the solstice, by making fires on the hill-tops, when people and beasts are made to pass through them, to ensure protection against pestilence.

Neither was the influence of the 'evil eye' less dreaded and guarded against by strange and oftentimes curious rites and customs. It is surprising to find this superstition existing widely over the world in ancient and modern times. Virgil's shepherd exclaims, 'Nescio quis teneros oculus mihi fascinat agnos!' The Irish and Scotch believed that their cattle could be blighted by an evil eye; the Malabars, Hindus, Arabians, Turks, and other eastern peoples wear charms to avert its influence; the Mahometans suspend objects from the ceilings of their apartments with the same intention; in Ceylon the Singhalese place white vessels on their gables to guard against the mysterious agency, which the Tamils at Jaffna, in the same island, believe to work injury on their herds and flocks. Sir J. Emerson Tennent[3] even asks if there is any hidden connection between the prohibition to *covet* contained in the tenth commandment, and the horror of the 'evil eye,' so frequently mentioned in the Old and New Testaments.

The fear and panic reigning in countries where plagues, either of man or the lower animals, have shown themselves, have never much abated; and at the present day, with all our science and enlightenment, the public mind is almost as troubled at their appearance as in earlier times: troubled not so much, perhaps, by the apparently inevitable destruction they are likely to cause, as by the mystery that shrouds their origin.

Though a Christian civilization has to a great extent removed the influence of superstitious ideas, with regard to the agency of evil spirits or spiteful gods, and though the polytheism of the heroic ages has been supplanted by monotheism, the commencement of these afflictions has still been often enough ascribed to sources as erroneous as before, and only too frequently the wrath of many gods has merely been condensed, if we may use the term, into that of one. Hebrew traditions have brought in the anger of Jehovah as a frequent cause of pestilence, and His displeasure as being made manifest, not on sinful man alone, but also on the unoffending creatures around him. The wise King, Solomon, a witness to the participation of the inferior animals in the

[1] Tour in Scotland in 1769, p. 100. [2] Critical Dissertations.
[3] Ceylon, vol. ii. p. 177.

calamities which befell men, enunciated a truthful saying, when drawing a comparison between the lord of the creation and his less favoured companions, and which may have had reference to their suffering alike from plagues: 'For that which befalleth the sons of men befalleth beasts; even one thing befalleth them: as the one dieth, so dieth the other; yea, they have all one breath; so that a man hath no pre-eminence above a beast.'[1]

To a people like the primitive Jews, next to a pestilence appearing among themselves, was a plague among their herds and flocks. 'Blessed,' says Moses, 'shalt thou be in the fruit of thy cattle, the increase of thy kine, and the flocks of thy sheep.'[2] And a curse from the Almighty was imagined to be the cause when the health of their cattle and sheep was blighted by sudden disease and death. The Egyptians were told, in the first plague which history mentions, that because they would not listen to Moses, or believe in his mission, 'Behold, the hand of the Lord is upon thy cattle which is in the field, upon the horses, upon the asses, upon the camels, upon the oxen, and upon the sheep: there shall be a very grievous murrain.'[3] The displeasure of the Creator was the ever-present cause; agencies of a physical nature were left unnoticed, and doubtless 'murrains' must have been frequent, general, and most severe, when the real exciting or predisposing causes were thus allowed to prevail unchecked.

The most striking examples of rampant superstition and gross ignorance meet us at nearly every step in our investigation into the history of animal plagues; and one is puzzled whether to lay most blame on those who led ignorant people astray, or on the people who could be so credulous and short-sighted as to be guided and ruined by designing or infatuated men. In the early Christian ages, the sign of the cross was burnt with a hot iron on the heads of menaced or already infected flocks, or their bodies were anointed with the oil and water from the lamps of some church in which reposed the musty bones of some saint or other; or at other times rows of such relics were lauded by the priests as efficacious remedies; while all the time the diseases—their causes, nature, and distinctive characteristics—were entirely neglected by the gullible priest-ridden people, until they were all but ruined, as is apparent in almost every page of the history of these visitations in the early and middle ages.

And the obstructive ideas which then prevailed have not even yet abated much in their rancour in many parts of the world. A displeased

[1] Eccles. iii. 19. [2] Deut. xxviii. 4. [3] Exod. ix. 3.

or spiteful Creator is still appealed to by prayers, ceremonies, and sacrifices to remove the devastating pestilence that revels amid indolence, bigotry, filth, and impurity. It is generally so much easier to pray than to obey sanitary behests. Laziness and priestcraft would rather believe in the vengeance of an Almighty power than in the troublesome causes which need active exertion and enlightened minds for their removal or prevention. In the middle of the 19th century processions of Greek and Turkish priests stream barefooted through the plague-swept streets of Constantinople, the former uttering loud appeals for deliverance from the scourge, and the latter calling upon Allah to protect them, though they are opposing the most urgent sanitary measures as contrary to the teachings of the Koran; all the while the two perplexed sects, in their dismal peregrinations, can scarcely breathe for the putrifying matters surrounding them, through which they have to scramble as they best can, and which is directly or indirectly slaying its thousands of the benighted population.[1] About the same period, in our own land, a dreadful contagion is decimating the herds and flocks; physicians prescribe impotent medical treatment; fast-days are appointed, and prayers are offered for riddance of the disease, for whose advent various reasons are given, but which are generally on a par with those of the early period of civilization. The imported 'Cattle Plague' in Britain is attributed by a learned priest (a Roman Catholic) directly to God's displeasure at our great love for animals, or 'cattle worship,' as he terms it; and he hesitates not to say of his own species, 'Perhaps the cholera is now sent to bring down the pride of the human intellect, and to compel the godless philosophy of the age to admire the intervention of the hand of God in all human events.'[2] In the mean time, all that is necessary is a little energy and wisdom on the part of statesmen and people to get rid of a contagion that is readily preventible, and that should never have been allowed to appear, and at any rate to spread.

But we must not be too hard upon the enlightened bishop for declaring that kindness to animals, which we have always considered a virtue, and looked upon as a part of Scriptural injunction, should be visited with punishment not on sinful man but on the innocent ruminants. During the same visitation the most extraordinary opinions have been emitted by preachers of another religious sect. One of these worthies in particular traced the origin of the malady to our national,

[1] See *Times'* Correspondent's letter from Constantinople, dated September 1st, 1865.

[2] *Dr Cullen.* On the Approach of the Cholera Morbus and other Evils, 1865.

but *carnal* love of beef, for which the murrain was sent as a Divine chastisement; and more than one clergyman declared the infliction of this painful malady on the creatures who had never sinned to be a mark of the Almighty's anger at the *laches* of the nation. There was no allusion, however, to the fact of such countries as Ireland or France, which may have been equally sinful, evading the terrible punishment by a little judicious care, and the exercise of that power and knowledge with which a benevolent, and not a malevolent, Creator, had endowed them. Such doctrines are unworthy of Christians, and carry us back to ages when the perpetration of the most atrocious crimes and the cold-blooded slaughter of whole tribes of men, women, and children were laid to the favour or disfavour of the God of mercy and love.

On the Continent, St Cornelius and other saints of France, and St Antonio of Rome and Italy in general, are the protectors of four-footed creatures; and it is much less troublesome for their owners, and more profitable to the priests, to obtain exemption from an approaching plague through the merits of a mouldy saint than by the adoption of onerous, heretical measures of a hygienic kind, which do not benefit the Church.

This blind superstition and infatuation, almost amounting to profanity, and which is incompatible with reason or true religion, is now happily on the wane; but in ages gone by it has acted most prejudicially, by diverting men's minds from the study of the nature and causes of diseases of this class. For what need was there to investigate or attempt to avert them, when they were sent from Heaven to punish sinful man?

Chiefly for this reason, we are left much in want of positive information as to the character of the various epizoötic diseases which have appeared since history first began to record them. As old as animated nature itself, their beginning is lost in the gloom of antiquity. The ancients, often completely ignorant of veterinary science, have left us but little information regarding them, for they seemed to dread transmitting more than vague generalities to posterity; and several of the detailed accounts are those of poets, who, in describing some one of those dreadful pests which spread far and wide, and caused fear and desolation to prevail, have probably had poetical effect more in view than accuracy.

Up to the 14th or 15th centuries, we can identify but few of the epizoöties mentioned as occurring in the preceding eras; for the historians of the early, dark, and middle ages were men who were either unacquainted with the forms assumed by disease, and merely tell us of their

disastrous effects as public calamities; or they were priests, usually only anxious to speak of the marvellous virtues of their prayers and mummeries in driving them from their localities. The natural events of a striking character which have either preceded or accompanied animal plagues,—and which might have led the inquiring mind to a more correct appreciation of the connection between them, and the appearance or disappearance of these maladies,—are, when noticed, generally too briefly described to afford any satisfactory guidance in this respect. It was generally considered sufficient to ascribe their advent to whatever might appear unusual in the celestial or terrestrial worlds; or, if these afforded nothing marvellous, to the wrath of a resentful deity. There was usually no attempt to chronicle those symptoms which would have rendered their descriptions of the greatest value to future historians; and it was, as a rule, only necessary to designate them by such general, though vague terms, as conveyed a striking idea of their deadly character, without preserving their distinctive features.

Thus it is that the word דבר *deber*, signifying plague, was employed in Hebrew speech to denote every kind of epidemic or epizoötic disease; while the Greeks gave the collective denomination of λοιμὸς, a plague, pestilence, or λοιμικὴ νοσος, a pestilential disease, alike to the general affections of men or animals, no matter what form they assumed or from what cause they arose. The Roman writers were no more explicit, but ambiguously styled them *pestis, pestilentia,* or *strages pecorum;* and the *ignis sacer* of Lucretius is scarcely more intelligible than any of the other terms employed.

The chroniclers of the Middle Ages, in transferring these designations to their own times, have added the equally indefinite appellatives of *mortalitas, clades, lues,* &c. Undoubtedly these vague expressions arose from ignorance and want of observation; for the bodies of the affected, while alive, were seldom, if ever, carefully examined, and scrutiny or dissection of the dead which may have perished from plagues of the most diverse character, was neglected or forbidden. Pathological anatomy had not made such progress as to convince the popular mind of its value; and, besides, what was the need for this troublesome inquiry when these afflictions were believed to arise from sources beyond the reach or power of man.

Terms as little significative as those of less enlightened centuries, such as *plague, murrain, distemper,* &c., are still in use as popular designations for these maladies. The term 'murrain' is, perhaps, for general purposes that best adapted to express that which technically

is termed an epizoöty. It is a very ancient word, and is to be found in many languages besides English. For example, it appears in Italian as 'moria,' and in French as 'murie.' Its root is found in the Greek μαραινω—maraino; in the Sanskrit 'mr,' the Latin 'mori,' German 'mar,' and the Celtic 'muire.'

Whatever term may now be employed, however, whether it be murrain, plague, distemper, or pest, thanks to science we need not fear its obscuring the real nature of the maladies designated, nor veil their possible sources by attributing them to agencies beyond man's powers of elucidation and control.

But from the circumstances before-mentioned, the historian of epizoötic diseases who would endeavour to compile a satisfactory chronological account of those visitations which have from time to time swept the plain, the homestead, and the stable of their occupants, previous to the centuries indicated, has but a slender chance of doing more than citing meagre facts, solitary, or in opposition to others which might otherwise give these facts more interest and certainty. Even to do this, he must labour earnestly, and gather from many sources the clue necessary to guide him in fixing the advent and duration of these maladies; and after all has been accomplished, in the immense majority of instances he will find himself unable to tell with precision what were the morbid characters distinguishing them from each other, or from diseases existing enzoötically elsewhere. The only advantage he might obtain in thus studying the plagues of the domestic animals, would be, at rare intervals, to find in the geographical invasion of certain epizoöties a marked connection between them and contemporary events, which might authorize him in making deductions of some value. It must be borne in mind, also, that famines, droughts, and the destruction of vegetation by locusts and various causes, as well as other mishaps, would affect domesticated and feral creatures no less, perhaps, than mankind; but that in very many instances the sufferings of these would have remained unrecorded when the panic and mortality among his own species entirely engrossed the attention of the historian. Hence, in reading of particular epidemies, particularly in the early centuries, we are only able to guess at the existence of contemporary epizoöties; and as it would be departing from one object of this work, I have in most instances omitted any mention of plagues described as affecting the human race only.

It is not until we approach the commencement of the 18th century, that the study of animal plagues becomes really interesting and satisfactory, and that research is abundantly rewarded by the fullest descrip-

tions of these visitations; for we find facts grouped according to their affinity in the series of cause and effect. This scientific method of transmitting what should be known of the history and nature of animal diseases to future generations, was inaugurated by the Italian physician Ramazzini, who undoubtedly laid the foundation for accurate observation in this department of veterinary science. And to this philosopher history is indebted for much that is known of one of the greatest epizoöties of modern days. From that time to the present, maladies of this class have been neither few nor far between; but observers have rapidly increased in number, and in proportion as these have attained the scientific proficiency necessary for such a difficult study, so have the nature of animal plagues, and the measures needed for their mitigation and prevention, become better known.

A detailed description of all the epizoötic or panzoötic diseases which have occurred would occupy far too large a space, and might not after all be a very useful study; those occurring within the last two or three centuries, however, deserve much attention, as competent men have exerted themselves to discover their origin, trace their affinities, define their characteristics, and, best of all, to modify or avert their desolating influences. A record of epizoötic diseases founded on history and accurate observation, cannot fail to be a work of great importance to medical science and to civilization. Nothing can be more useful than to possess the most exact details as to the character, progress, duration, and termination of these maladies, and especially if our knowledge of pathological changes of structure be brought to bear in observing and describing the organic lesions effected by them.

The comparative pathologist can no more afford to dispense with the history of diseases, than the healer of mankind, especially those of a general character; for in proportion as he knows the past, he is in a better position to control the present, and make provision for the future. As an eloquent writer remarks, when about to describe an epidemic disorder whose cause was very obscure: 'No single generation of medical practitioners can be expected to possess a sufficient range of observation, or to accumulate adequate materials of information on the subject, to enable them to detect the clue by which to thread the intricacies of this inquiry. The past must be scrutinized, and its reflected light brought to our aid; old and new facts when collated, by the harmony which they exhibit, become mutually illustrative, and acquire a value previously unknown. It is true, that medical records abound in fallacious and imperfect observations, transmitted from one generation to another, and that popular prejudices have exercised an influence in dis-

seminating error, which the obstinacy engendered by the evidence of imperfectly observed facts has tended to confirm and to perpetuate; but it is possible to manifest too indiscriminate a contempt for statements which partake of popular superstition.'

Vicq-d'Azyr truly says, that if there is in medicine an object worthy the investigation of scientific men, it is without contradiction the pestilential epidemic diseases. Obscure and often mysterious in their causes, rapid in their progress, perplexing in their symptoms, and murderous in their effects, they often sweep away the majority of the individuals attacked, and through their violence put it beyond the power of the physician to diminish the number of victims. And the illustrious Hecker justly affirms that the study of epidemic diseases 'is a subject in which science is deeply interested, and which, according to the direct evidence of nature herself, is one of the most exalted and important that can be submitted to the researches of the learned. How often,' he adds, 'has it appeared on the breaking out of epidemics, as if the experience of so many centuries had been accumulated in vain. Men gazed at the phenomena with astonishment, and even before they had a just perception of their nature, pronounced their opinions, which, as they were divided into strongly-opposed parties, they defended with all the ardour of zealots.'

The study and prevention of animal scourges, as we have seen, is scarcely second to those affecting our own species, but they are attended with even greater difficulties. The healer of men, consulted when a pestilence is raging, and when death is seizing numberless victims, can, as we are all too painfully aware, afford but little aid. The rapidity with which the disease does its work, and its generally obscure nature, throws him into a sea of doubt, from which he can but slowly, if at all, extricate himself. He who ministers to the ailments of animals, and who ordinarily has to contend with obstacles to which the other is a stranger, is seldom in a better plight when a formidable spreading disease visits one or more species. Those people among whose herds a malady of this kind first appears are too often the opposite of intelligent, and usually see in its invasion the simple effects of some vulgar cause which they imagine can be easily determined; while in the death of their cattle they are only conscious of a local and individual loss, far from involving the most insignificant interests of their country.

As in man, when general diseases or 'plagues' first appear in the lower animals, they are usually very acute, and in consequence of this, of the suddenness of their attack and the rapidity of their course, as well as their tendency to spread, it is a matter of the utmost import-

ance, in order that a nation be spared great loss, inconvenience, and anxiety, that the science of comparative pathology should receive that wide and judicious study and that fostering care to which it may with great justice lay claim. And as it is yet in its infancy in this country, and is obliged to contend with prejudice and charlatanism, it cannot be wondered at that great losses have been sustained, that the science of medicine in general should make but little progress, and that the defective state of our sanitary police should merit the derision of continental nations.

The medicine of the lower animals differs from that of man in no particular, perhaps, so much as in those principles which may be termed 'utilitarian.' The life, or rather the vigour and sound condition, of all the domestic animals, has a money value which greatly modifies considerations of a curative kind, when health and usefulness are replaced by disease and inefficiency. The life of man, though it be robbed of nearly all its attractions or utility, is yet considered too sacred to have a mere pecuniary value. But that of the creatures we have domesticated is in almost every case worthless, if, when they are attacked by disease, the expense of medical treatment exceeds their market price, even though a thorough cure may be possible. But when there are doubts as to the certainty of complete restoration to health and soundness, monetary considerations ordinarily decide against the adoption of remedial measures.

This peculiar feature in the medicine of the domesticated animals, brings all the more prominently before us the value of the old adage that 'prevention is better than cure.' The comparative pathologist must not only be well skilled in all those branches of science of which medical knowledge is composed, and be able to minister to the varied and numerous ailments of the domestic animals, but above all he should be thoroughly conversant with the history and nature of general diseases, their causes, particularly their mode of extension, as well as the best measures to recommend for their prevention and eradication, so as to be able to guard the country from the risk of serious loss and embarrassment.

In Britain, as before mentioned, the value of comparative pathology, in the relation it bears to human medicine, to the public health, to agriculture, and to legislation, has been strangely overlooked,—and this, in recent times, has not only been the cause of a great national calamity, but to some extent a national disgrace.

In consequence of this neglect, but little allowance has been made for the difficulties the comparative pathologist has to contend with, nor

has the chief object of this science received much consideration. The rare instances in which animals can be seen by the Veterinary Surgeon in the earliest stages of disease,—when it would prove most amenable to medical treatment,—due to the incapacity of those who have the care of them to recognize these early periods; the fact that animals cannot, except in a negative way, tell their wrongs or explain their sensations; the absence of those accessories and comforts of the sick-room which cannot be called in to ameliorate their condition; the violence or stupor, as well as the structural arrangements and position, of the plague-stricken creatures; the many obstacles to their complete segregation when the malady is of a contagious character; the slender means generally afforded for attending to recommendations and injunctions; and the oftentimes intractable nature of general diseases, as well as the utilitarian influences spoken of above;—all these, in the majority of instances, militate against the adoption of curative measures, and add a thousandfold to the value of those which have the prevention of disease for their object. And these considerations demand that the whole aim and skill of the comparative pathologist should be employed not in *curing*, but in *preventing* disease.

That this object has in this country formed but an insignificant element in medical teaching, is amply illustrated in the history of the cattle epizoöty of 1865, when this easily suppressed scourge was allowed to spread over the land through the silly endeavour to exorcise it by pills, potions, and fantastic nostrums prescribed by men who neither knew the organization of the animal nor the nature of the malady for which they were prescribing, and this despite the urgent remonstrances of those who had studied veterinary science.

To the comparative pathologist, the history and investigation of animal plagues will ever be of paramount interest, as they must always demand his most earnest study. To discover their affinities in the various species of animals brought under the dominion of man, to ascertain all that can be learned of their nature and the laws by which they are governed, as well as to elucidate the causes which originate them, and their mode of propagation, is no light task; but it is only by this study that he can reasonably hope to resist them with success.

Besides this, their investigation is a most attractive occupation for the enlightened mind, apart from its practical bearing. An introduction is afforded to subjects of the mightiest importance in the physical and organic worlds; and the wonderful relationship which exists between life and the elements surrounding it—the reciprocal influence of these, and the connection between cause and effect — are the most in-

teresting and engrossing of any subject the human intellect can grasp for examination. In the beautiful language of Hecker, 'that Omnipotence which has called the world with all its living creatures into one animated being, especially reveals himself in the desolation of great pestilences. The powers of creation come into violent collision; the sultry dryness of the atmosphere; the subterraneous thunders; the mist of overflowing waters, are all the harbingers of destruction. Nature is not satisfied with the ordinary alternations of life and death, and the destroying angel waves over man and beast his flaming sword.'

To the general historian, the history of these plagues proves a valuable guide in determining the progress of mankind, by showing the checks which have tended to retard that progress and have often produced marked changes in the manners and customs of a nation, in peace as in war. In this history we can clearly trace the advance of human improvement.

To the medical philosopher who desires to see his science stand on the broadest basis, as well as to the lover of his species, the study of general diseases in animals cannot fail to be of much moment. The same class of causes which generate epidemic maladies are, we may be certain, fertile in inducing similar diseases in the lower animals, and perhaps also in plants, on which the human family so much depends. For it has been a matter of common observation from the earliest times, and our history will testify to its accuracy, that widespread pestilence in plants, and murrain in animals, have frequently either preceded, accompanied, or followed closely on those visitations which caused mortality and mourning in the habitations of men; showing an identity of causation or affinity which strongly tempts the inquirer to solve the secret of their joint production. And when it is remembered that some of the animal plagues are readily transmissible to man, and often induce deadly maladies in him, there is additional incitement to their study.

To the agriculturist and political economist a knowledge of the history of these affections must always be of the most pressing importance, as the science of comparative pathology has clearly shown that many of the diseases of animals which are indigenous to our soil may be deprived of their generating causes, and thus be altogether abolished.

Up to a recent period, the almost isolated position of Britain, with her superb flocks and herds, her matchless breeds of horses, and her fine pastures, has rendered her comparatively secure against an invasion of those dread epizoöties which are foreign to her shores. Since, however, her ports have been opened to the importation of animals from all parts

of the world, and since communication by sea and land has become so rapid and extensive, she is scarcely more exempt from these afflictions than her continental neighbours. Nor is she so well prepared to encounter them. The science on which other nations rely, and with such benefit, to suppress these contagions, has scarcely yet found a home in Britain.

When a destructive disease threatens the domestic animals, and, through them, the most valuable section of our national wealth, it should be the duty of all concerned to obey the dictates of science and experience, in order to avert danger and loss. But it must be confessed that to attain successful results individual efforts go for little. It is on the strict observance of sanitary laws, and to the wise measures prescribed by authority, that reliance must be placed. In the words of an eminent medical writer, 'The day has gone past for an isolated individual or craft to avert pestilence, as Empedocles did when he shut out the sirocco by stopping a mountain-gap, and removed intermittent fevers by changing the course of the river Hypsa. These large and beneficent operations are in our day reserved for GOVERNMENTS; and our duty as a profession is to urge upon Government, by means of our own governing bodies, the necessity of undertaking the prevention of epidemic disease, both among men and animals, to point out the best modes of securing this prevention, and to see that these measures, when become law, are properly carried out. In a word, it is our duty not to appropriate to ourselves, as is too often erroneously done, but to endeavour to impress upon our rulers the sentiment so nobly urged upon Cæsar by Tully, 'Homines enim ad Deos nulla re proprius accedent quam salutem hominibus dando.'

Agriculture must ever occupy a higher position than manufactures; and the prevention of epizoötic diseases should be regarded as a political question, involving more or less the well-being of the whole community; not merely affecting those who own or who endeavour to derive profit from rearing animals, but also affecting the public at large, as regards health, the supply of food, and other essentials. In the extension of a disease of this kind, not only is there loss to the individuals who possess the animals, but also to the public, who have not only a diminished quantity or more expensive supply of food, but also often incur the risk of obtaining it of an inferior or injurious quality, or are otherwise inconvenienced.

No more startling fact is afforded us in the history of animal plagues, than that which proves that the cattle of this country have been persecuted by contagious diseases of a most destructive character for nearly

thirty years without any attempt worthy of the name having been made to check them, though they were, and are now, of a preventible nature, and spread solely through the medium of infectious or contagious principles. The losses from only two exotic bovine maladies ('contagious pleuro-pneumonia' and the so-called 'foot and mouth disease') have been estimated to amount, during the thirty years that have elapsed since our ports were thrown open to foreign cattle, to 5,549,780 head, roughly valued at £83,616,854. The late invasion of 'Cattle Plague,' which was suppressed within two years of its introduction, has been calculated to have caused a money loss of from five to eight millions of pounds. But these examples and estimates, after all, give but a slender idea of the devastation, misery, embarrassment, and loss that has been due to our ignorance, apathy, and neglect of the teachings of veterinary and sanitary science, which must, nevertheless, claim the merit of having conclusively demonstrated that the most formidable diseases can be readily repressed or altogether abolished, though not by attempting to cure them; and having done so, nothing remains for these sciences to accomplish than to indicate the steps necessary to make the legislation of a wise Government effective in its dealings with animal plagues in general.

HISTORY

OF

ANIMAL PLAGUES.

CHAPTER I.

PERIOD FROM B.C. 1490 TO A.D. 400.

HISTORY can never inform us of the long-continued and great losses which have befallen the nomadic tribes, many of whom have never heard bread even mentioned, and who derive their subsistence entirely from the milk and flesh of their domesticated animals.

True, the fossil remains of creatures exposed now and then in the upper crust of the earth make us acquainted, to a certain extent, with diseases to which the lower orders of creatures were subject, 'long ere the waters overflowed and the mountains sank,' but their feeble testimony serves us but little. We can only learn that infinite myriads paid their debt to nature untold ages before mankind appeared in the world; but of the cosmical changes which induced their destruction, or the general maladies which may have swept off whole species, we are in ignorance.

So that, in reality, the history of epizoötic diseases, as noted in the records of civilization, is limited, and embraces but a small portion of that great history which can never be written, because the materials for it have never been chronicled.

Our earliest researches begin with the land of Egypt as the unenviable birth-place of plagues affecting the inferior creatures, no less than mankind. Its geographical position and its physical

configuration have contributed much to render it insalubrious. The lower country is annually exposed to far-spreading inundations by the flooding of the Nile; and the retiring sea leaves behind it a reeking morass, which, owing to the nature of the deposit left behind, together with the large amount of moisture, and the hot sun shedding its rays direct upon it, shortly after becomes a beautifully green plain, covered with the rankest and most luxuriant vegetation, and pools of stagnant corrupted water. Then quickly succeeds a period when it is an arid desert, deeply laid with dust and hot sand, and endowed with nothing that could tend to the welfare of animal life.

The indefatigable professor of the school at Abou Zabel, M. Hamont, says of Egypt, relative to epizoötic maladies: 'The breed of cattle in Egypt is generally weak in constitution, and neglected. Epizoötic diseases frequently effect the most dreadful ravages among them; sometimes they devastate the country to such a degree that men are harnessed to the plough and the cart, in order that the land may be, although imperfectly, cultivated, and some assistance obtained.' Horses suffer much from farcy, and the same authority adds: 'Softening of the liver in Egypt is a primitive and essential malady, very widespread in the army and in the country, more common in summer than in winter, and attacking by preference the fattest horses, and those of an adult age. It is a very redoubtable disease, and kills many horses.'

Intestinal hemorrhages are also very frequent and most fatal to horses. These animals—cattle, sheep, and camels, also—suffer from a deadly dysentery. Hamont continues: 'Dysentery is very common in summer among troop and other horses, attacking those which live in the open air, as well as those which inhabit low, badly ventilated stables. In regiments there sometimes breaks out, during the months of July and August, an acute form of dysentery which kills the horses in a few hours. The mud, earth, and sand which the water of the Nile contains, and which these animals drink, is the cause of this dysentery; these matters are found in the intestines. The great crowding of animals, the intense heat, too dry and unvaried food, are also determining causes. . . . The dysentery of cattle is especially

widespread, attacking the oxen in the villages and towns, and all over the country; as well as the government herds. It is a murderous disease, destroying life with great rapidity. . . . The dysentery of camels is sometimes acute, sometimes chronic, and kills a very great number; when it is acute its course is very rapid. At Cairo, the camels are lodged in great enclosures open on nearly every side. There they pass their days and nights in the cold season, after a very hot summer, and in this state, of course, they must experience the troublesome effects of the sudden diminutions of temperature which take place.'

One of the forms of anthrax, which is enzoötic and epizoötic in Egypt, appears to be very destructive among cattle in the form of gangrenous sore-throat. 'This disease reigns over the whole of Egypt in winter, summer, springtime, and autumn. It is contagious, and carries off the animals in two, four, and six hours. It has its seat in the throat; a tumour appears there, quickly increases in size and extent, and at last causes death. The expired air and the saliva communicate the disease, as experience has testified. It is sporadic, enzoötic, and epizoötic, and its causes are unknown. If the practitioner arrives in the commencement of the disease, he ought at once to apply the actual cautery to the throat, then some blistering ointment.'[1]

Splenic apoplexy is also very frequent among ruminants, and malignant pustule is seen in the horse in the months of May and June, during the prevalence of the very hot wind of the Kamessine. On the extreme confines of history—but not until long after civilization had made great progress—and among its earliest notices, do we find striking descriptions of the havoc that reigned in that ancient region.

In the 80th year of the life of Moses, in the reign of Pharaoh IV., King of that country, 'a very grievous murrain,' known as the 'Fifth Plague,' fell upon the flocks and herds of the Egyptians, and destroyed them. Many perturbations in the natural world were noted. After a damp winter, an unhealthy summer set in, the days being hot and fiery, the nights cold and dewy, and sometimes rainy. Towards the autumn there was thunder and

[1] *Hamont.* L'Egypte sous Mehemet Ali, vol. i. pp. 564, 565, 574, 577, 583.

lightning, heavy hailstorms, and excessive drought. The air seemed pestilential, and as if of fire, while the nights were damp and chilling. Storms of sand and dust thickly enveloped everything as they were borne along on the sultry wind; and cattle, as well as the human species, were exposed to great risk of suffocation. The waters, owing to their impregnation with some substance, or to the sudden appearance of some animal or vegetable matter, became of a red or blood colour. In the rivers and streams all the fish died; and these, as well as the lakes, became putrid throughout the lowlands of Egypt. The peculiar condition of the atmosphere, and the corrupt state of the water, caused the rapid growth of immense swarms of frogs, which invaded every place. By some unknown agency these were all destroyed, and when their remains were gathered into great mounds by the fear-stricken inhabitants, the disgusting odour from the putrefying heaps became a deadly poison. Vermin covered the bodies of men and animals; clouds of winged insects harassed them night and day; and these misfortunes, together with the tempestuous weather, originated a fearful pestilence among all the domestic creatures then kept by the Egyptians. The human species were next attacked, and suffered much; and a terrible storm of lightning and hail destroyed cattle and vegetation. Masses of locusts, carried over the land by the east wind, blackened the face of the earth and devoured what was left of the herbage. Other horrors were added, and, to crown all, a dread distemper slew the firstborn of man and beast.

If we can judge by the meagre description of the malady that attacked the Egyptians at the same time that their cattle were suffering, and which was known as the 'sixth plague,' the epidemy and epizoöty would appear to have been of a carbuncular nature.[1] Paulet[2] remarks, with reference to the character of the disease: 'Il y a apparence que ces ulcères étoient la suite de tumeurs inflammatoires, n'étoient autre chose que des charbons ou des bubons pestilentiels, surtout de charbons, couverts de cloches ou de vescies, qui s'abscédoient, ce qui arrive souvent dans ce cas, et constituoient une peste, vraisemblablement moins

[1] Exodus, chap. ix.

[2] Recherches sur les Maladies Epizoötiques. Paris, 1775. Vol. i. p. 22.

meurtrière que la première, qui fut mortelle pour tous les animaux, et désignée par ces mots, *pestis valde gravis.* Ce qui suppose un degré de force de plus.'

Whewell [1] says that it is supposed the murrain only attacked those cattle which were exposed on open pasture; another proof as to the probability of the disease being anthrax. A still stronger proof than this, however, is to be found in the exemption of the cattle of the Israelites from the plague of boils as well as flies, and which has been judiciously ascribed, I think, to the fact, that 'the land of Goshen, in which the Israelites dwelt,' was sandy pasture above the level of the river, while the rest of Egypt was low-lying, and its soil submerged by the rising of the Nile.[2]

We might surmise, however, that the Israelites and their flocks and herds escaped destruction owing very much, besides the miraculous intervention of Providence, to the great care with which Moses inculcated upon that people the necessity for separating the clean from the unclean, the healthy from the diseased, and taught the value of disinfection;[3] as if the influence of contagion had been already known to mankind.

That the Egyptians were acquainted with the Veterinary Art from a very early period is certain, for on their most ancient frescoes veterinary surgeons are accurately depicted attending to the maladies of oxen and other animals, while the written characters indicating physician or doctor of these various creatures are plainly inscribed underneath the paintings.[4] We can well imagine the severe trial their skill would undergo in contending with such a murderous pest as that just noticed.

B.C. 2048 (A.M. 2820.) An epidemy and epizoöty in Ireland. The Partholani, or tribe of Parthalon, waged war with 'rebellious miscreants and tyrannous giants,' whom they utterly annihilated in a fierce battle, and cast their carcases out 'like a sort of dead dogs, whereof through stinke of the same, such an infective pestilence ensued in all places throughout the island, by corruption of the ague, that few escaped with life except those that got them

[1] History of the Jews.
[2] *Westwood.* The Entomologist's Text Book.
[3] Leviticus, chap. xiii.
[4] *Wilkinson.* Popular Account of the Ancient Egyptians.

away by sea; yea, the infection was so great of those cursed carcases of Cham and his posterity, that the *dogs* and *wolves* died thereof.'[1] The chronology of the Irish epizoöties up to the Christian era is not so well established as one could desire. I can only make an approximation to the dates, those given in brackets being the ones shown in the 'Census of Ireland for the year 1851, part 5.'

B.C. 1260. To Seneca we are indebted for the description of an epizoöty and epidemy in Troy during the reign of King Laomedon. 'The first fury of the pestilence struck the listless sheep by their loathing the rich grass. The priest stood ready to strike, whilst his hand raised on high threatened instant death. The sluggish bull with gilded horns staggers: with unrestrained neck, he suffers from a tremendous blow. Nor did his blood stain the iron instrument with which he was killed for sacrifice. Black corrupt blood welled forth from the wound. The horse, still more torpid, fell in his course in the ring, and threw his rider with his shoulder to the ground. The cattle in the fields lie down. The bull, the herd perishing, pines away. The shepherd is disheartened, his herds and flocks being diminished, and he dies in the midst of the rapidly wasting oxen. The stags do not fear the ravenous wolves; the roaring of the angry lion ceases; there is no fierceness in the shaggy bear; the slothful snake exhibits symptoms of the plague, is dried up, and dies with his poison vapid. The woods lack their beautiful foliage, which usually affords shade to the dense mountains. The country does not flourish with the fruitfulness of the soil.'[2]

(A.M. 3197.) Grafton, speaking of Riuallus, King of Britain, who reigned at this period, writes: 'In his time (as Gaufride sayeth) it rained blood by the space of three days continually within the land of Britain. After which rain ensued a great and exceeding number and multitude of flies, the which were so noisome and contagious that they slew many people. And after this (as sayeth an old author) ensued great sickness and mortality, to the great desolation of this land.'[3]

[1] *Hanmer.* Chronicle of Ireland. [2] Œdipus, v. 37, 70, 124, 201.
[3] *Grafton.* A Chronicle at large and Meere History of the Affayres of England. London, 1569.

(A.M. 3972.) In Ireland it is mentioned that 'every cow that was calved in Findoll's reign was white-headed.'[1]

B.C. 1200. During the reign of Minos, the island of Ægina was visited by a plague which did fearful injury to living creatures, and which Ovid has most graphically described. M. Paulet imagines the disease to have been a form of gangrenous sore-throat, accompanied by acute fever, and perhaps erysipelas, and of a contagious nature. The cause of it, of course, was the wrath of an enraged god, though the long-continued heat and damp state of the weather, predisposing to malignant and putrid disease, is not overlooked in the description. The poet[2] makes the distressed Æacus relate its commencement and course. Dogs, birds, sheep, and oxen, as well as wild creatures, were attacked by the pestilence before mankind, a fact worthy of notice in this poem, which, as might be expected, bears traces of exaggeration and fanciful description, mixed up with much that must have been gathered from observation.

The early Greek historians have left but few records of pestilential diseases among the domestic animals. The fathers of medicine may have bestowed more attention on the maladies incidental to their own species than to those of the creatures they had domesticated, and thus neglected the study of the diseases to which they were liable. But perhaps the principal reason why epizoötic affections are not alluded to arose from their rarity, the natural salubrity of the climate of Greece, and the isolated situation of its various islands, which afforded but little opportunity for the origin or diffusion of general affections. Hippocrates, who appears to have collected all the medical knowledge existing before his time, and who often examined dead animals, scarcely notices the diseases peculiar to them. In one passage, he observes that goats and sheep are very liable to epilepsy (*Lib. de Morbo Sacro*), probably due to hydatids on the brain; in another it is remarked that cattle are much disposed to luxations of the hip (*Lib. de Articulis*); and most remarkable of all, he refers to oxen, sheep, and swine as infested by hydatids, when endeavouring to prove that dropsy in man often depends on

[1] Book of Lecan.

[2] Metamorphoses, Book vii.

the presence of these entozoa. 'Hydropem etiam ex phymatis oriri mihi argumento sunt boves, oves, et sues; in his enim ferè quadrupedibus pulmonis phymata oriuntur, quæ aquam continent: sectione namque factâ citissimè cognoveris cum aqua effluet.' (*De internis Affect.* par. v.) He speaks of having been informed by those who understood horses, that these animals were liable to all the infirmities with which mankind is afflicted.

(A.M. 5001.) 'There was a great mortality of kine in Ireland in Breasal's reign.'[1] From this circumstance the king received the cognomen of Bodhiobhadh (cow destruction), or Breasal Bodivo. 'In his (Breasal's) time there was such a morreen (murrain) of cows in the land, as there were no more then left alive but one bull and one heifer in the whole kingdom, which bull and heifer lived in a place called Gleam-Samasge.'[2] The tradition of this event is still preserved in Glensawisk, or the Glen of the Heifer, in the parish of Lower Bodoney, County Tyrone. This is the first cattle epizoöty on record in Ireland.

B.C. 1183. An epidemy and epizoöty broke out, according to Homer (B.C. 907), during the siege of Troy. At that time, 'whence to Greece unnumbered ills arose,' Chryses, high-priest of Apollo, was dismissed by Atrides, with threats, when he went to the Grecian camp to ransom his daughter from the hands of her captors. The old man in his anger prays to Apollo for revenge:

> '. . . . his pray'r Apollo heard:
> Along Olympus' heights he pass'd, his heart
> Burning with wrath; behind his shoulder hung
> His bow, and ample quiver; at his back
> Rattled the fateful arrows as he moved:
> Like the night-cloud he pass'd; and from afar
> He bent against the ships, and sped the bolt;
> And fierce and deadly twang'd the silver bow.
> First on the mules and dogs, on man the last,
> Was pour'd the arrowy storm; and through the camp,
> Constant and num'rous, blazed the fun'ral fires.
> Nine days the heav'nly archer on the troops
> Hurl'd his dread shafts.'[3]

[1] Annals of the Four Masters. [2] Annals of Clonmacnoise.
[3] *Homer's* Iliad, Book i., Earl Derby's Translation.

Homer does not forget to indicate the cause or the probably contagious character of the pestilence, by describing the precautions taken in the Greek camp to cleanse and purify, and to throw all filth and obnoxious matter into the sea.

B.C. 1100. There were twenty-five years' drought in Spain, so that there was neither food for man nor pasture for cattle. Springs dried up, rivers failed or became stagnant, and only a few olive trees on the banks of the Ebro and Guadalquiver remained to testify to the little vitality yet left in the vegetable kingdom. The land was full of 'dreadful mortalities, plagues, and miseries of every description.'

The occurrence of droughts almost invariably, as we will have occasion to notice, forebodes disease to man and beast, and they have ever been looked upon with dread.

'While travelling through the country, I received several vivid descriptions of the effects of a late great drought, and the account of this may throw some light on the cases where vast numbers of animals have been embedded together. The period included between the years 1827 and 1830 is called the "Gran seco," or the great drought. During this time so little rain fell that the vegetation, even to the thistles, failed; the brooks were dried up, and the whole country assumed the appearance of a dusty high-road. This was especially the case in the northern part of the province of Buenos Ayres and the southern part of St Fé. Very great numbers of birds, wild animals, cattle, and horses perished from the want of food and water. A man told me that the deer used to come into his courtyard to the well which he had been obliged to dig to supply his own family with water, and that the partridges had hardly strength to fly away when pursued. The lowest estimation of the loss of cattle in the province of Buenos Ayres alone was taken at one million head. A proprietor at San Pedro had previously to this 20,000 cattle; at the end not one remained.'[1]

B.C. 753. Plutarch[2] informs us that soon after the murder of Tatius a great pestilence broke out at Rome, which was in-

[1] *C. Darwin.* Journal of Researches. 6th edit. London, 1845, p. 133.
[2] Vita Romulus.

stantaneously fatal to animals and men. It did great evil, and during its fury blood is said to have been rained. The red colour of the rain was due, no doubt, to the presence of a vegetable organism in the atmosphere, owing to some favourable conditions for its development. Zonaras says that the earth and cattle were barren: 'sterilitas agrorum et pecudum.' The crops failed, and the beautiful and fertile country of Campania, before greatly depressed by the murder of Tatius, was now sadly troubled by famine, pestilence, and the sword.

From the earliest ages animal plagues recur in the history of Rome, a city which was afterwards to become so famous for terrible calamities that Livy styled it 'urbs assiduis exhausta funeribus.' Tacitus, in his description of Rome, intimates the almost regular occurrence of 'tempus grave aut annus pestilentiæ.' Its situation, no doubt, greatly favoured these attacks. Built on the low banks of the Tiber, surrounded by malarious tracts of country, and subject to inundations and commotions of the elements, it furnished for centuries the most fearful examples of epidemic and epizoötic visitations. To the south lay the Pontine marshes, a tract of land extending from Nettuno to Terracina, about 45 miles long and from 4 to 11 broad, which at no distant period before had been covered by the sea. In the early times of the Roman Republic, according to Pliny, 33 cities existed there; but these, either by wars or increasing miasma, very soon disappeared. What are termed the marshes are formed by great quantities of water, received from innumerable streams, which, rising in the neighbouring mountains, run into the plain, where, for want of a sufficient declivity towards the sea, their course is very slow, until they become stagnant, and at length lose themselves in the sand. They now contain immense pastures, where horses, cattle, and herds of buffaloes graze as in the early ages of that once great empire. The air, particularly in some seasons of the year, is even at present very unwholesome. The inhabitants are pale and sallow, suffer much from fever, and the lower animals are subject to various maladies peculiar to such situations.

In the south part of Tuscany, and not far from the Eternal City, lies the Maremma, another marshy region, which, by reason

of its being pervaded by unhealthy exhalations from a soil abounding in sulphur and alum, cannot be inhabited in summer without danger, for then the population is driven away by fever, and the *mal'aria* frequently sweeps down the streets of Rome.

The great Ostiensian marshes, similar to the Pontine, added their insalubrious emanations to those from the other sources; so that, during unfavourable seasons, Rome and its environs generally suffered severely. Even the most fertile and healthy districts, on which the Romans depended for grain and cattle, were sometimes exposed to these influences; and Campania, still one of the most beautiful and productive parts of Italy, once the resort of the most distinguished patricians, and where, as Goethe says, 'it is worth while to till the ground,' did not escape those devastations for which the country in general was so noted. Eusebius, the Father of Ecclesiastical History, when describing a plague which reigned in the Roman Empire in A.D. 314, mentions the state of the atmosphere. 'The air was so noxious and everywhere so deranged with corrupt vapours, fumes from the earth so putrid, winds from the sea, exhalations from marshes and rivers, so injurious, that a certain poisonous liquor, as it were from putrid carcases, was brought by the elements, and covered the subjacent seats or benches, walls, and sides of houses, and the dew appeared like the sanies of dead bodies.'[1] Much was also due, no doubt, to the unsettled state of the empire. Constant wars and revolutions retarded agricultural operations, desolation often reigned, and severe famine was but too frequently a consequence. Hygiene was neglected, even the rivers and fields were filled with putrefying matter; so that men and beasts, birds and fishes, perished together, *vulgato per omne genus animalium morbo.* At the present day, notwithstanding attempts at drainage around Rome, the plain of Latium and the country near it are uninhabited deserts, miasmatic to a deadly degree.

The epizoötic maladies of the domestic animals, but especially of the ox, a creature particularly susceptible of disease, would be very serious with such a people as the Romans, who depended so much upon the services to be obtained from them. A destruction

[1] *Eusebius.* Chronicon. Paris, 1628.

of cattle was with them a destruction of the earth's produce, for the soil could not be tilled, and from this would arise a famine. 'Sine quibus (sc. *Bobus*) nec terra excoli nec humanum genus sustentari ullatenus poterunt,' says Vegetius. Livy mentions that neglect of culture and scarcity of corn were the usual effects of epidemical sickness: *Defuncta civitate plurimorum morbis perpaucis funeribus pestilentem annum inopia frugum neglecto cultu agrorum, ut plerumque fit, excepit.* This neglect of agriculture might, on many occasions, be the effect of disease among the cattle, as it was here of sickness among men; in which case it would be the cause of an epidemic, as it is here said to have been the effect of it.

B.C. 545-6. A great famine and pestilence at Rome and in the plain of Latium. Vast numbers of cattle died from a murrain, and to such extremities were the inhabitants reduced that the Volsci were compelled to petition the Romans for assistance in re-peopling their cities.[1]

B.C. 488. A plague of animals and of men. 'A certain pestilential disease affected all creatures, and made great havoc amongst cattle. The mortality among mankind, however, was not great, for they escaped the dangers arising from this disease.'[2]

B.C. 476. During this year, and for some years subsequent to this period, Spain was visited by various pestilences.[3]

B.C. 472. According to Mariana[4] a plague reigned throughout nearly the whole world. It began in Egypt, and at length reached Spain, the disease generally commencing among the cattle. A peculiar feature in its progress was that it nearly always appeared in the country districts before it reached the towns.

B.C. 463. During a year of great heat and drought, the Latins and Hernici were devastating the country around Rome. The evil consequences arising from the fatigues of war were greatly increased by crowds of country people, who, with their

[1] *Dionysius Halicarnassus*, *Functius*, and *Muratori*.
[2] *Dionysius Halicarnassus*. Antiq. Rom. vii. 68.
[3] *Florian de Campo*. Vol. i. lib. ii. chap. 45.
[4] *Juan de Mariana*. Historia General de España.

herds and flocks, fled for safety from the plundering tribes within the walls of the imperial capital. As a result of the over-crowding and the other misfortunes, disease appeared about the calends of September, and caused great mortality until the end of November. Horses and cattle were first attacked, then man. Dionysius writes: 'When first attacked by this disease, the horses and the oxen fell victims. After them goats and sheep succumbed, so that it was necessary to destroy all four-footed beasts. Then it (the pestilence) attacked herdsmen and farmers, and passing over the whole country, at length fell upon the city.'[1]

(A.M. 5160.) To show the mildness of the season in Ireland, we are told that in the reign of Conaire there was abundance of nuts. 'The cattle were without keepers in Ireland in his reign, on account of the greatness of the peace and concord. The wind did not take a hair off the cattle from the middle of autumn to the middle of spring. Little but the trees bent from the greatness of their fruit during his time.'[2]

B.C. 453. According to Livy and Dionysius, the pestilence *loimikie* (probably anthrax) destroyed nearly one-half the inhabitants of Rome as well as their cattle. The disease spread to the Æqui, Sabines, and Volsci, and inflicted great loss on them, killing their herds and flocks, and causing such havoc that the land was left uncultivated, and famine thereby induced. Another plague succeeded this, which lasted from B.C. 443 to 438.[3]

B.C. 431. At Rome a disease appeared among animals in this year, which extended to mankind. Livy writes concerning it: 'Great suffering prevailed that year in consequence of drought. Not only were the heavens without water, but the earth, being deprived of its natural moisture, hardly supplied the perennial rivers. Everywhere the cattle died from thirst around dry fountains and streams. The murrain having ceased, common contagious diseases seized the people; those residing in the country were first affected, after which the city was ravaged. Nor were their bodies alone affected by the pestilence, for their minds were also assailed by manifold religious ceremonies, most of them of foreign origin.'[4]

[1] Op. cit. ix. 67. [2] Annals of the Four Masters.
[3] *Livy.* Lib. iii. 32. *Dionys.* Lib. x. 53. [4] *Livy.* Lib. iv. 25, 30.

B.C. 430. The plague of Athens, so lucidly described by Thucydides, occurred during the second year of the Peloponnesian war. Thucydides and Lucretius mention that birds were rare, dogs died, and that rapacious animals would not devour the bodies of the dead. 'For the same reason there came a disease to cattle, also sickness to bleating flocks. And although many unburied bodies lay on the ground, yet the birds and beasts of prey either kept at a distance to escape the stench, or when they had eaten of them they began to grow weak as death approached. Neither did any birds rashly appear in these lands, nor did the wild beasts leave their haunts in the woods at night, for they began to languish from the pestilence and die. But, foremost of all, the faithful dog was attacked, tainting the air in the highways with his disease, while the ruthless poison drove the sickening spirit from every limb.'[1]

Thucydides gives us the supposed cause. 'As they (the Athenians) had no houses, but dwelt in booths all the summer season, and in which there was scarcely room to breathe, the pestilence destroyed with the greatest confusion; so that they lay together in heaps, the dying upon the dead, and the dead upon the dying. They were tumbling one over the other in the public streets, or lay expiring round every fountain, whither they had crept to assuage the intolerable thirst which was consuming them. The temples of which they had taken possession were full of the dead bodies of those who had expired there. . . . . For as this distemper was in general virulent beyond expression, and its every part more grievous than had yet fallen to the lot of human nature, so in one particular feature it appeared to be none of the natural infirmities of man, since the birds and beasts that prey on human flesh either never approached the dead bodies, of which many lay uninterred, or certainly perished if they ever tasted it. One proof of this is the total disappearance at that time of such birds, for not one was to be seen either in any other place or near the carcases. But the dogs, because of their constant familiarity with man, afforded a more notorious proof of this event.'[2]

[1] *Lucretius.* Lib. vi. 1123, *et seq.* [2] *Thucydides.* Bello Pelop. ii. 49.

A similar pestilence raged in Persia, Egypt, Libya, and Ethiopia.

B.C. 399. A great epizoöty at Rome is described by Livy. 'The year was remarkable for its stormy and frosty winter; so severe was it that the Tiber was unnavigable. Either in consequence of the unseasonableness of the weather—a sudden change having taken place, or from some other cause, a trying, and to all animals a pestilential, summer, succeeded the terrible winter. Neither the cause nor the termination of this incurable mortality could be divined. . . . . In the former year an unbearable and almost miraculous winter set in; in the following year pestilence raged through town and country, as though the angry gods were venting their displeasure.'[1]

It is somewhat strange that Aristotle, who lived about this period, did not give any detailed description of epizoötic diseases in his History of Animals. He mentions scabies, canine madness, and arthritis—a disease endemic and enzoötic in Greece, and the only one, according to this writer, to which the unbroken droves of horses wandering over the plains were liable. Some of the maladies of animals are enumerated by him, such as tetanus, the iliac passion, and phthisis of cattle, but the great animal plagues are forgotten, if we except the one termed *malis* which, he says, was peculiar to the ass species. This word was used by the Greeks to signify the most serious diseases of animals, in something the same manner as the word *loimos* was employed to distinguish the pestilential maladies of man.

The *malis* manifested itself principally by a discharge of thick mucosities from the nostrils, and it was believed the seat of the disease was usually in the head. 'If the malady reached the chest,' says Aristotle, 'they died, but if it was confined to the head it could be cured.' The etymology of the word signified nothing more than a glanderous discharge, and the Romans translated or rendered it by the term *profluvium atticum*, a disease, or rather a symptom, according to them, nearly always fatal in animals, but which characterized more particularly what we now term 'glanders' in horses and asses.

[1] Op. cit. v. 13—15.

Aristotle excluded fishes from the list of animals subject to pestilential diseases. 'Morbus pestilens nullus insidere piscibus videtur, qualis plerumque hominibus et quadrupedibus, equis, et bubus, et reliquis generis nonnullis accidit tum feris tum urbanis.' (*Histor. Animal.* lib. viii. chap. 19.)

B.C. 332, 296, 291, 278. The Tarentian war was succeeded by a most desolating pestilence, invading both cities and suburbs, and carrying off chiefly women and cattle. In 278 it was known as the *Abortus epidemicus*, and was particularly fatal to pregnant females and cows at Rome. 'A grievous pestilence invaded the city and its environs, which attacked all, but especially the women. The fœtus was killed in the womb, and discharged from it. Miscarriages exposed mothers to great danger; so much so, that it was feared that a future population and breed of animals would be wanting.' [1]

B.C. 218. In Spain there was a fatal epizoöty among dogs and birds.[2]

B.C. 216. Polybius mentions that the horses of Hannibal's army were attacked by a disease while they were in the marshes of Etruria, and through which they lost their hoofs. 'Equorum etiam multis, ob longum per paludes iter, ungulæ exciderunt.' [3]

B.C. 212. At the siege of Syracuse, a putrid disease broke out among the Carthaginians and Romans who were under the command of Marcellus. It was supposed to have arisen from over-crowding, a badly cultivated and undrained country, scarcity and bad quality of provisions, and the inundations from a stagnant lake which was always suspected of being the cause of maladies. After speaking of the excessive heat of the autumn, and the miasma arising from the marshes, Silius Italicus goes on to say,—'First the dogs felt the effects of the plague; next, the pestilential vapours in their rapid course attacked the birds, then laid low the wild beasts in the woods. Still surely onwards crept the infernal pest, and finally devastated the camp by destroying the troops. The tongue became dry, and a cold sweat crept over the trembling body; the drooping jaws denied the

[1] *P. Orosii.* Histor. Lib. iv. p. 2. [2] *Mariana.* Op. cit.
[3] Universal History.

proffered food, a hacking cough wore out their lungs, and the hot breath came out from the parched mouth.'[1]

B.C. 203. In the neighbourhood of Capua, a mighty swarm of locusts filled the country, and caused general destruction everywhere.[2]

B.C. 200. Cato the Elder, who lived about this time, in his valuable and admired treatise on husbandry makes allusion to the epizoötic and other diseases of the lower animals. While giving superstition its full share of attention, he wisely has an earnest desire to be more practical. 'If there be reason to fear,' says he, 'the presence of an epizoötic disease, it is most essential to give to the cattle a mixture of salt, laurel leaves, onions, cloves of garlic,[3] incense, powdered rue, and burning charcoal, made up with a little wine.' So much for his preventive treatment. His remedial measures were simpler. 'If an animal becomes affected with the disease, make it swallow an egg whole, and the next day give a clove of garlic beaten up in wine.' To restore the appetite of oxen which are sick, he recommends sprinkling their forage with oil dregs, and this fluid might also be given in a little water every four or five days as a restorative and fortifiant. 'By this means,' he adds, 'cattle will be insured against disease and kept in a thriving state.'[4]

B.C. 175-6. Rome was again the scene of a dreadful pestilence. This was preceded by a most inclement season, and while the malady lasted swarms of locusts ravaged Apulia and cleared off the vegetation before them. Sicinius the prætor was sent with an army to drive them away. Livy says that the disease began amongst the cattle, and soon after attacked mankind. Those who lived for seven days did so with great difficulty, and were liable to be seized with a quartan fever. The lower classes were the principal sufferers, and their dead bodies lay about the roads, untouched by dogs or vultures, and were allowed to rot there. No vultures were seen in this, nor yet in the former year.[5]

[1] *Silius Italicus.* Punic War, chap. xiv. v. 580—626.

[2] *Livy.* Lib. xxx. 2.

[3] Onions and garlic formed the principal ingredients in a pretended specific for cattle plague in A.D. 1865.

[4] Rei Rustica Scriptores Veteres. Leipsic, 1735. [5] *Livy.* Lib. xli. 18—21.

B.C. 134. The army of Scipio Æmilianus, the Numantine, was operating in Palestine and the adjacent countries. Water proved to be so scarce that wells had to be made, but the liquid obtained from them gave rise to a malignant epizoöty among the horses and beasts of burden. Great loss was sustained; and the disease continuing to spread, the army had to be moved to the healthier plains of Numantia, in order to get rid of the pestilence.

B.C. 126. An eruption of Mount Etna. The following year (127) pestilence in Africa, which was attributed to shoals of dead locusts. These creatures having been brought over by a strong east wind, and having devoured all vegetation, even to the bark of the trees, were driven by a southerly gale into the Mediterranean and drowned, after which they were again washed on shore during hot weather, and putrefied there. The pestilence occasioned by the decomposition of their bodies destroyed more than a million of people, and the domestic animals also suffered. The odour was intolerable.

Thomson has well said that plagues are 'the offspring of inclement skies, and of legions of putrefying locusts.' The visits of these creatures to eastern countries have frequently induced famine, pestilence, and death, and history records these effects of their incursions, alas! too often.

B.C. 43. Eruptions of Etna; an excessively hot summer; dark, gloomy weather; heavy rains; extensive inundations of the Po, the Ciuca, Segre, and the Isonzo, were the cause of many diseases, but especially those of a carbuncular nature affecting oxen, horses, dogs, and even many other creatures. The deer tribe in the forests were not exempt from the attacks.

This period is remarkable for the poetical description of some of these epizoötic diseases written by the illustrious Roman poet Virgil, he who sang of 'shepherds, fields, and heroes' deeds.'

If he had made veterinary science a special study, he could not have sung more truthfully or learnedly for the age in which he lived. The frequent visitations of, and sad havoc wrought by, epizoötic diseases seems to have struck him as an alarming fact.

'Not whirlwinds from the sea so frequent rush,
Big with the storm, as pests 'mid cattle rage.
Nor individuals sole disorders seize,
But, suddenly, whole flocks, with every hope,
At once, and, from the youngest, all the race.'

And when the pestilence had broken out, and

'Tisiphone, all pale, before her drives
Disease and fear, and each succeeding day
Tow'rs more and more with her detested brow—'

who so careful to watch her progress and note her manifestations as the Mantuan bard? In the third book of his Georgics he gives an account of a dire disease which destroyed nearly all the living creatures on land or in the water in the vicinity of the Julian Alps. Some authorities imagine that he has attempted to describe the different diseases of each species: the malignant exanthematous affections or the ardent pestilential fever accompanied by vertigo of the horse, the pleuro-pneumonia of the cow, the inflammatory fever of the sheep, the malignant sore-throat of the pig, and the rabies of the dog; but in all probability it is an account of one of those dreadful calamities that smote all, from man downwards, perhaps a little exaggerated for poetical effect, though of this we must not judge too harshly. In his other descriptions of kindred subjects in the same poem we find great accuracy, and a fidelity which will hold good even now, and for all time; therefore we must conclude that an adherence to truth was his great object, and that the real value of his precepts was never sacrificed to his poetical genius, but only polished and embellished by the mind of a great master.

The apparent causes of the disease were severe autumnal heat, impure water, and rank pasturage.

'From tainted air arose
A dreadful storm, inflamed by autumn's heat,
And gave to death all cattle, tame or wild,
Corrupting lakes, poisoning the grassy food.'

Death was fearfully sudden, for he says,

'Oft at the altar as the victim stood,
Amidst the sacred honours of the gods,

While the white fillet cover'd that of wool,
As paused the lingering priest, it fell and died :
Or had the flamen timely struck the blow,
On altars placed, fibres refuse their blaze,
And question'd prophets can no answer give :
And scarce the steel employ'd is tinged with blood,
That barely stains the surface of the soil.'

His pictures of the various animals passing through the different stages of the disease are most vivid and striking, and betray much feeling for the sufferings they endure.

'Hence amidst springing grass young cattle die,
And yield their gentle lives at loaded stalls ;
Hence madden fawning dogs, and the sick swine
With suffocation shake, and panting cough.'

The horse obtains the largest share of notice.

'He falls—his fire all lost—his grass forgot—
The victor horse ; from fountains turns away,
And quick and oft beats with his feet the ground ;
Fallen are his ears—uncertain is his heat,
And clammy chills proclaim approaching death ;
Arid and hard, his skin resists the touch.
These earliest signs announce the fatal pest ;
But if in progress the disease grows fierce,
Then are the eyes inflamed, and deep the breath
Is drawn, sometimes with heavy groans ; the flanks
Distend with lengthen'd sobs ; the nostrils run
Black blood, and the rough tongue clings
To the obstructed jaws. Through the inserted horn
Lenæan streams infused once gave relief,
And this for the dying seem'd the only hope.
But this inflamed the pest, when strong in rage
They burn'd, and now themselves, 'mid pangs of death
(May the gods guard the pious, and thus curse our foes !)
Tore their own mangled limbs with naked teeth.'

Next, the toiling, 'trailing-footed ox' has his history told.

'Lo ! as the bull under the plough-share smokes,
He falls, and vomits mingled foam and gore,
And makes his final groan. The ploughman sad
Disjoins the ox that mourns his brother's fate,

And leaves the rooted plough, the work half done.
The shades of deep'ning groves, the softest meads
Move him not now, nor stream through rocky bed
That pure as amber freshens all the plain.
His flanks are all relax'd, and his dull eye
A stupor covers, and to earth his neck
Down rushes with the heavy weight it bore.
What profit then their service and their toil?
Yet not the sparkling flow of Massic wine,
Nor feasts replenish'd, ever injured them;
They feed on leaves, and eat the simplest herbs,
Their cup the liquid founts and rapid streams;
They have no cares to break their wholesome sleep.'

So deadly had been the plague among cattle that

'No other time, they say, those regions knew
When cows were sought for Juno's sacred rites,
And unmatch'd bulls drew to her shrine the car.
Therefore men toiling break the earth with rakes,
And with their very nails prepare the crops,
And over lofty hills, with outstretch'd necks,
Drag on the creaking cart.'

The species of the victims increase.

'The felon wolf
No longer lays his plots around the fold,
Or takes his nightly walk; a sterner care
Subdues him. Timid deer and flying stags
Now amongst dogs and horses range at large;
Whilst of the sea immense, all swimming things
On the shore's verge, like shipwreck'd bodies, float,
Wash'd by the wave. Phocæ to rivers fly,
And seek a refuge never known before.
In vain defended by his winding den,
The viper dies, and with his scales erect,
The frighten'd hydra; while the birds themselves
Insufferable find the tainted gale,
And falling, leave in lofty air their lives.'

All remedies seem to have been in vain, for we are told that

'No change of food affords relief,
And *art implored destroys*;'

signifying, probably, that the medicines employed tended only to aggravate the disease. The shepherd could do nothing but,

'Sitting still, pray heav'n for better luck,'

or take advice, and

'With speedy knife the fault coerce, ere yet
The dire disease creeps through the careless flock.'

Human skill was foiled.

'The masters yield,
Philyrian Chiron, and Melampus sage.'

The mortality among the domesticated animals increases fearfully,

'Till men dig deep and bury them in earth.
The skins are useless, nor the tainted flesh
Can water cleanse, nor raging fire subdue;
Nor is it possible to sheer the fleece,
So damaged with disease and filthiness;
Nor can the weaver touch the putrid web.
But should a man attempt the odious garb,
With burning pimples and disgusting sweat
His limbs are seized, and in no lengthen'd time,
The fire accursed consumes his poison'd frame.'[1]

A.D. 10—14. After the destruction of the Milesian nobility by the Attacotti, the first great famine which we read of in Christian times occurred in Ireland in the reign of Cairbre the 'Cat-headed,' the last king of the Aitheach-Tuatha. 'The earth did not yield its fruits to the Attacotti after the great massacre which they had made of the nobility of Ireland, so that the corn, fruits, and produce of Ireland were barren; for there used to be but one grain upon the stalk, one acorn upon the oak, and one nut upon the hazel. Fruitless were her arbours, milkless her

[1] *Virgil.* Georgics, lib. iii. v. 495, *et seq.* Some commentators are of opinion that Virgil's description of this dreadful epizoötic anthrax fever (which much resembles the South American *derrengadera*, as described by Don Ramoro Paez for the year 1838) has been written in imitation of Thucydides and Lucretius. Others, again, think that the principal facts have been derived from personal observation in the year 43 B.C., a dreadful period in history, and described in his first Georgic. —*See* Heynes' 'Notes.'

cattle, so that a general famine prevailed over Ireland,'[1] during the five years that Cairbre was in the sovereignty.

A.D. 67. A comet was seen this year, after which followed a destructive tempest in Campania. Earthquakes took place at Hieropolis and Laodicea. Six hundred sheep were killed in Italy by gases emitted during an earthquake.[2]

'The desire shown by ancient writers to preserve the records of eclipses which preceded or followed any important event is of the greatest value, as we can thus easily fix the date of such events; for the chronology of eclipses is founded on immutable causes, and any fact stated to have occurred synchronously with phenomena of the kind, can at once, by that very circumstance, find its determined place in chronology.'[3] By eclipses we can also test the veracity of a historian, and frequently discover the system of his chronology. An idea prevailed very extensively, and to a certain degree obtains credence still among writers upon philosophy as well as medicine, that eclipses and cometary influences affect the organized world, and are one of the causes of blights and pestilences; and it was probably from being imbued with such impressions, that the early annalists noted eclipses of the sun and moon so carefully. But the object of introducing their occurrence into a modern history of these pestilences is more with a view to fix a clue to the date and authenticity of these, than to favour such theories.[4]

A.D. 69. During the reign of the Emperor Nero it rained so much of the so-called blood in Albania, that rivers ran blood. An epizoöty broke out among the domestic animals, and an epidemy in man.[5] The accounts of some Roman authors would lead to the inference that the symptoms of the malady corresponded with those of the epizoötic pleuro-pneumonia of our own times.

Columella, who lived at this period, and whose influence on the progress of Veterinary Science in that early age was very

[1] *O'Cleary.* Book of Conquests.
[2] *Seneca.* Also *Orosius*, vii.; and Magd. Eccles. Hist. ii. 53.
[3] L'Art de Vérifier les Dates, &c. Paris, 1783, vol. i.
[4] The Census of Ireland.
[5] *Tacitus.* Annals, xvi. *Suetonius.* Vita Nero, 39.

great, speaks of many of the diseases of the lower animals; and after mentioning the symptoms of this attack, says that the death of the cattle might be averted if a seton was put in the ear, by means of a fibre from the hellebore root, and giving them for many days a pint of leek juice, mixed with a like quantity of olive oil and a pint of wine. The pest was deadly —a kind of phthisis: Est etiam illa gravis pernicies cum pulmo exulceratur, inde tussis et macies et ad ultimum phthisis invadit. The same writer also mentions a kind of pest which affected mares, but the symptoms described do not permit us to recognize it. The animals became suddenly emaciated, and died in a short time. In the commencement of the malady, it was useful to injeet fish-brine every day into the nostrils, in order, as he says, to purge the pituitary membrane, and cure the patients. He likewise describes an epizoötic affection that showed itself in lambs and young goats, and which Paulet says bears some resemblance to a peculiar ovine disease now known, which localizes itself in the skin of the face, and is analogous to ring-worm. The shepherds of those days called it *mentigo* or *ostigo*, and it consisted in ulcers of a bad character about the lips and inside the mouth. Its ordinary cause was eating herbage yet covered with dew. It was fatal to the unweaned animals:—*labes mortifera lactantibus*. The remedy was to rub the affected parts with a decoction of equal parts of hyssop and salt; to wash them with vinegar, and then to dress them with an ointment composed of liquid pitch and lard. In all likelihood it was an aphthous affection.

The flocks of sheep and goats were very subject to general diseases. Such was the goat plague—*caprarum pestilentia*, a most formidable and deadly malady, which swept off whole flocks in a very brief space. 'These animals, usually so lively and hardy, do not lose condition or show languor, like other animals when attacked, but they drop all at once, as if struck by lightning, and quickly perish. From the moment one is seen to be affected, the whole flock should be bled, the sickly ones should be killed, and those yet in health have the juice of reed-roots and hawthorn to drink in rain-water.'

The pneumonia of sheep is indicated; the treatment was to

be the same as that for pigs—*ovem pulmonariam ut suem curare convenit*, &c.

There was another disease, to which the inhabitants of the Campagna gave the name of *Coriago*. It consisted in so close an adherence of the skin to the ribs, that it was impossible to detach it. Columella attributed it to the heavy rains to which the oxen were exposed during their labour. His remedy was to rub them frequently with wine in the sunshine.

Much attention is given to the *ignis sacer* of sheep. He says, 'Est etiam insanabilis ignis sacer, quem pusulam vocant pastores.' 'If it is not arrested,' he adds, 'when the first animal is attacked, it soon affects the whole flock. There is no remedy for it. The disease is irritated by the least touch, and nothing but the milk of goats can help to allay its intensity.' Dolus Mendesius, a veterinarian of Egyptian origin, is cited by him as one who was able to give the method of recognizing and arresting the disease. This method consisted in often examining the backs of the sheep, and if the slightest redness was perceptible, they were to be promptly killed, and buried in their skins. Was this the ovine small-pox? Some authors have thought it was. There are some circumstances in favour of this opinion, which we will notice at a later period.

In the ninth chapter of the sixth book [1] Columella goes on to say, 'When an ox has the fever,'—which may have been that peculiar type of Cattle Plague of which we have had such painful experience,—'he must not be allowed to eat for the space of a day; after which, and before he has eaten anything, a little blood must be abstracted from under the tail, then he must be made to swallow thirty cabbage leaves baked in oil. This food is to be given for five days, and while fasting, and he is to have, besides, the tops of the lentisk, the olive tree, or any other species of tender-leaved plants, or branches of the vine, and cold water is to be allowed him to drink three times a-day.' 'This treatment,' he insists, 'ought to be followed out in the cow-house, and the animal should not be allowed in the open air until cured.' 'The fever is present,' he adds, 'when tears are

[1] Scriptores Rei Rustica. *Gesner*, 1787.

trickling down the face, when the head is carried low and heavily, and the eyes are closed; when the saliva flows from the mouth; when the respiration is shorter than in health, and seemingly embarrassed, or sometimes accompanied by groaning.' In chapter xiv. we have a description of the epizoöty. 'It is a grave disease, consisting in ulceration of the lungs. It produces cough, loss of flesh, and consumption. Another disease is noticed, in which sometimes there arises a swelling of the palate, which causes the animal to refuse food, to sigh, *suspiriosè laborantes*, and to seem uncertain on which side he should fall. The palate must be torn with the iron to make it bleed, and he must be given softened vetches.' Change of air he lays much stress on, after recommending setons in the ears.—*Suspiriosè laborantibus auriculæ ferro rescindendæ, mutandæque regiones; quod in omnibus morbis ac pestibus fieri debere censemus.*

The most sensible advice he gives, with regard to the treatment of animals, is to separate the healthy from the unhealthy —*Segregandi à sanis morbidi;* and he sarcastically makes mention of Dolus Mendesius, a contemporary veterinarian, as a man who recommended that the first sheep that was attacked by the *ignis sacer*, gangrenous erysipelas (?), should be killed and buried at the entrance of the sheep-fold, as if he thought it a dangerous custom in those days; for this disease was often epizoötic, and it is believed now to be very contagious when so.

A.D. 76. 'God took vengeance on the Aitheach-Tuatha (Attacotti) for their evil deed (the slaughter by King Fiacha of the white cattle in A.D. 56) during the time that Elim was in the sovereignty, namely, Ireland was without corn, without milk, without fruit, without fish, and without every other great advantage.'[1]

A.D. 92. A *loimic* plague is described by the Jewish philosopher Philo, who believed it to have been caused by hot dust. 'The clouds of dust suddenly falling on men and cattle, produced over the whole skin a severe and intractable ulceration. The body immediately became tumid with efflorescences, or

[1] Annals of the Four Masters.

purulent phlyctenæ, which appeared like blisters excited by a secret fire beneath.'

A.D. 190. 'About this time a great pestilence raged over all Italy, and became most violent in Rome by reason of the great concourse of people assembled from all quarters of the world. Wherefore a great loss of life took place amongst oxen and men, the excited cattle perishing amongst the people.'[1] The sweet smell of the laurel-tree was supposed to counteract the contagion. The people of Rome were advised by their physicians to fill their noses and ears with odorous substances, and to use perfumes, so as to nullify human effluvia and the contagious atmosphere. Famine and pestilence raged for three years.

A.D. 216. Widespread pestilence in Italy, affecting man and beast.[2]

A.D. 238. In Ceylon 'a great famine and plague occurred during this reign, attributed to the malignity of the red-eyed demon. It was to appease this demon that a devil-dance was instituted, which is kept up to this day.'[3] Forbes thinks this was small-pox, a disease which afterwards ravaged that island on many occasions.

A.D. 260. When Saphor, King of Persia, was besieging Nisibus, his elephants and beasts of burden were so suddenly and furiously attacked by swarms of gnats, as to kill or disable them, thus causing the siege to be raised, and subsequently leading to the discomfiture of that monarch's army.'[4]

A.D. 314. In the reign of Constantine the Great, the large island of Cyprus was 36 years without rain. So great a famine ensued that all its animal inhabitants forsook it and fled.[5]

A.D. 376. In this long interval, epidemics of various kinds had reigned throughout the world, and caused incalculable mortality; but though some of these, from their nature, may have extended themselves to the lower animals, and thus rendered

[1] *Herodian.* Hist., book i. [2] *Helvetius. Cavriol.* Hist. Brix.
[3] *Forbes.* Eleven Years in Ceylon. Appendix, p. 286.
[4] *Theodorite.* Hist. Eccles. book ii., chap. 30. [5] *Petavius.*

their infliction doubly severe, there is no mention of their having done so. In these obscure ages, and in nearly every subsequent one, as we will often have occasion to observe, when plagues have slain myriads of human beings, the greater evil has swallowed up the lesser, or rather veiled it, and no record is made of epizoötic diseases, though we may strongly suspect that they have often accompanied, if they have not preceded and perhaps caused, directly or indirectly, those widespread maladies in mankind.

In this year, after the sanguinary irruption of the Huns under Attila, the expulsion of the Goths from Hungary, and the fierce internecine wars of the whole Germanic population, there was an extraordinary famine and a deadly *epidemic*. The preceding winter had been very cold, the summer very dry, and shocks of earthquake had been frequent.

A most severe and memorable epizoöty began in the east of Europe and spread westward. It was exceedingly fatal, and caused great loss, the cattle being no sooner attacked than they died. Curative measures proved useless, and no healthy animal was safe unless it was branded on the forehead with a red-hot iron in the form of a cross. So says, at any rate, the credulous and marvel-loving Cardinal Baronius,[1] who of course adds that this miracle converted crowds of people to Christianity.

Paulet and Dupuy think there may have really been some virtue in this application of the actual cautery, but only that of a *physical* kind. As might be expected, any benefit supposed to be conferred on the animals by means of this crucial firing, when suggested by the miracle-working priests, would be readily placed to the credit of the Church. The shape of the iron was all-important, and Camper fancied that the custom of painting white crosses on the stable-doors in Holland was the remains of this superstition.

As is well known, Europe was in a sadly disturbed state at this time from the invasions of the so-called barbarians, while the consternation and fear their advance and depredations occasioned was rendered more embarrassing by this Cattle Plague. St Ambrose, who lived at this period, plaintively writes: 'Hunni in

[1] *Baronius.* Annales Ecclesiasticæ, vol. iv.

Alanos, Alani in Gothos, Gothi in Taifalos et Sarmatos insurrexerunt. Nos quoque in Illyrico—exules patriæ, Gothorum exilia fecerunt et nondum est finis. Quæ omnium esset fames lues pariter hominum cæterique pecoris, ut etiam nos qui bellum non pertulimus, debellatis tamen pares fecerit pestilentia.'[1]

From the course pursued by the epizoöty and its deadliness, we have every reason to believe that it was the veritable 'Cattle Plague,' so called, of our own days. In a curious poem, entitled 'De Mortibus Boum,' written by Sanctus Severus,[2] one of the earliest Christian poets, and a native of Aquitania, who lived in the 4th century, its progress and fatality are particularly dwelt upon, and for the first time we have mention made of Hungary as the birth-place of plagues—a country which for centuries afterwards was to bear this unenviable reputation. The poem is in the form of an eclogue, in which three shepherds are introduced. One of these, Buculus, is lamenting his bad fortune in having lost all his cattle, while the others try to console him in offering their sympathy. In this lament we are enlightened as to the origin, symptoms, and most efficacious treatment of the malady, the sign of the cross being the one certain preventive recommended. The disease appears to have travelled from Hungary, through Austria, to Dalmatia. By Brabant it obtained access to the Low Countries, Flanders, Picardy, and so on to the other provinces of France.

A.D. 381. Theodosius being emperor, Constantinople suffered much by an earthquake. Fifty-seven of its late-built towers on the walls were thrown down. It lasted by fits for six months, demolished many fair churches and fortresses, and expelled the citizens from their houses to the fields. It raged also by sea, swallowed up many ships and several fine islands. . . . . These earthquakes were followed by a great famine, and the air was so infected that many thousands of people perished by the contagion, with multitudes of cattle.[3]

Vegetius Renatus, whose writings we will notice more particularly hereafter, was a skilful agriculturist and hippiatrist, was

[1] Commentar. in Luc. Lib. ix. 21.

[2] Magna Bibliotheca Octerum Patrum, per M. de la Bigne, p. 334.

[3] *Clark.* Exampl.

probably contemporary with the invasion of the Huns at this period, and may have been an observer of this epizoöty. He gives us the following description of what he terms the *malis* or *malleus* (designated *maul* in the old English translation), and which may have been the Cattle Plague. After dwelling on the care to be taken of oxen while in health, and showing that no less care and diligence must be employed against their maladies than against those of horses, he says of this *malleus:* 'As this disease, and removing in different species of distempers from one to many, does by its infection destroy the horse kind, so it also kills oxen, though by different persons it is called by a different name, and for the most part by that which the common people give it. If at any time this disease attacks an ox, it is recognized by the following symptoms: The hair is erect, and the animal appears sad, his eyes stupid and languid, the head and neck drooping, and saliva continually flowing from his mouth; his walk is slower than usual; his spine appears to be stiff; he shows a very great loathing, and ruminates very little. If about the beginning of the distemper you attempt to give him relief, he will escape the danger; but if through negligence you be too slow in applying a remedy, the destructive quality of a disease that is become inveterate cannot be overcome.' After describing the treatment to be pursued, and the necessity for mixing salt with the fodder of oxen, he remarks as to the causes of disease in these animals, but particularly this *malis,* in these words: 'If oxen be roused up, so as to be put upon running at their full speed, at any time of the year, but especially in summer, either they contract thereby a looseness which proves pernicious to them, or it gives occasion to slight fevers; for this animal being naturally slow, and rather adapted to labour than to swift motion, is grievously hurt if forced to any work to which it is not accustomed. . . . . But if an ox has swallowed hog's excrement, then he presently undergoes the plague of that contagious disease called the *maul* (I quote from the old English translation), which, when once it has broken in upon a herd, either of great or small cattle, whether of such as are trained for labour or otherwise, presently all the animals which have the least suspicion of the distemper must be removed from the usual pasture-ground and distributed

in those places where no cattle are pastured, so that they may neither hurt one another nor themselves; for, by feeding on the grass, they infect it, and the fountains, also, by drinking in them; and they also infect the cribs in the stalls where they stand: so that oxen, though previously perfectly sound and in good health, perish by the smell and by the breath of those that are sick and diseased blowing upon them. The dead carcases also must be thrown out at a great distance beyond the bounds of the villa, and buried very deep in the earth, lest the bodies of those that are sound be infected by them, and they perish. This distemper is called by one general name, the Plague, or Pestilence, but there are many varieties of it.' The nature of this malady cannot be accurately determined by the symptoms enumerated, but it is obvious that several affections are included in this general designation. For instance, 'it is named the "humid distemper" when a humour flows from the ox's mouth and nostrils, and a loathing and sickness follows upon it. It is called the "dry distemper" when no discharge appears, but the animal loses condition daily, and has no appetite. It is called the "articular disease" when the oxen go lame, sometimes in their fore-feet, and sometimes in their hind-feet, although their hoofs are perfectly sound. It is called the "subrenal disease" whenever there appears a weakness in their hinder parts, and because they are supposed to have a pain in their loins. It is called the "farciminous disease" when tubercles come out over the oxen's whole body, open themselves, and are healed, and break out again in other places. It is also called the "subcutaneous disease" whenever a very bad humour breaks out in different parts of the oxen's body, and discharges. It is called "elephantiasis" when very small cicatrices appear like scabs, or like small lentils. It is called a "mania" or "madness," which takes away the senses from oxen that are in good condition, so that they neither hear nor see in their usual manner; of which distemper they very quickly die, though they may look fat and cheerful.

'All these diseases are very contagious, and if one animal be seized by them they pass immediately to all; and so they bring destruction sometimes either upon whole herds or upon all those that are fully domesticated and trained to labour. Therefore it

is that the animals which have been attacked must, with all diligence and care, be separated from the herd, put apart by themselves, and sent to those places where no animal is pastured, lest by their contagion they endanger all the rest, and the negligence of the owner be imputed (as is usually done by fools) to the Divine displeasure.'[1]

Apsyrtus, a renowned Greek Veterinarian of this period, also speaks in his writings of this *malis* (μαλις), though it is quite as evident that he mixes up indiscriminately the characteristics of several dangerous maladies under the indefinite term.

[1] *Vegetius Renatus.* Ars Veter. London, 1748, p. 221.

CHAPTER II.

PERIOD FROM A.D. 400 TO A.D. 1500.

A.D. 400. In this century we find veterinary science progressing, and becoming more fit to take cognizance of epizoötic diseases. The authors who treat of veterinary subjects are more numerous, and some of their works are yet extant. The Emperor of the Eastern Empire, Constantine, gave every encouragement to the noble emulation he had raised in regard to the conservation of the domestic animals, and the perfecting of the veterinary art, and many able writers dedicated the results of their researches to him. Among these we have Vegetius Renatus, Count of Constantinople, who complains that in his time the science was much neglected, and did not receive all the attention which its importance demanded, and which he estimates next to that of human medicine. In his 'Treatise on the Veterinary Art' he has left us a clearer, more precise, and a more extended catalogue of diseases than any of his predecessors. There is much, of course, in the treatise derived from ignorance and superstition. As a proof of this, we may notice that he avers that if an ox eats the excrement of a pig, he must be treated as a pestiferous animal.[1] These weaknesses we must tolerate in return for

[1] *Si autem porcinum stercus bos devoraverit statim pestilentiam contagionis illius mallei sustinet morbi.* Book iii. chap. ii. It is curious to find Columella giving a similar opinion: *Et id præcipue quod egerit sus ægra pestilentiam facere valet.* Book vi. chap. v.

the anxiety he displays to add to the slender stock of knowledge in this department of science. He enumerates a great number of pests, all of which he specifies as contagious, but of the correctness of this we may justly have our suspicions.

The humid pest, or *malis* of the Greeks,—the *profluvium atticum* of the Romans,—was marked by a mucus, or purulent discharge from the nostrils and mouth, and loathing of food. It appears to have been the glanders of the horse, and in all probability a cattle plague; *Nam equinum genus morbus qui appellatur* MALLEUS, *diverso genere passionum emigrans per plures contagione consumit. Boves quoque idem morbus interficit sed a diversis diverso nomine vocatur.* The articular pest was characterized by lameness of the anterior or posterior limbs, the feet being also affected. The skin or subcutaneous pest was contagious, and due to the presence of an acrid humour, which attacked different parts of the body, and did much harm. The animals were continually rubbing themselves. The plague of elephantiasis, or leprosy, was another affection of the skin. The mad plague, in which the oxen neither heard nor saw, and from which they died quickly, although they were lively and in good condition but a short time before. There were also the farcinous, the dry, the renal, and other plagues. According to this writer, whenever an animal was affected by any of these *pests*, it immediately infected all the others; hence the urgent reason for separating all the diseased at once from those yet in health, and in such a manner that no contact, mediate or immediate, could take place. Cohabitation was always a source of great danger. A change of air and situation was particularly lauded: *ne contagione suâ omnibus periculum generet et negligentia Domini sicut solet à stultis fieri, divinæ imputentur offensæ.* When all this had been done, and not till then, every effort was to be made to cure the tainted. Incense and other medicaments, powdered and dissolved in wine, were prescribed and administered by the nostrils. Perfuming and deodorizing with sulphur, bitumen, and marjorum were enjoined, because not only did they favour the operation of the remedies, but they assisted in destroying the pestilential virus, and preserving other animals from the plague.'[1]

[1] *Vegetius Renatus.* Re Veterinaria.

Apsyrtus, a famous veterinarian, though not treating of epizoötic affections in his 'Hippiatrica,' appears to be better informed than Vegetius on diseases in general, and his treatment is always simple. His descriptions of the symptoms of disease are more exact and life-like, and he seems to have investigated the causes of maladies with much skill. We have an example of this in what he says of the horse when suffering from what he terms fever. 'When the horse is sick from fever, he carries his head heavily, and as if immovable; the eyes are swollen, and he can scarcely open them. The lips and all the body are flaccid, the testicles pendent, the breath and the body have a burning heat; he fixes his limbs, and is insensible to blows, and when compelled to walk, he is every moment likely to fall.' We may notice in passing that his picture of fever reminds one most forcibly of the symptoms we observe in influenza of the horse. The causes of fever, he explains, are violent riding, heat, cold, and indigestion, especially that form which arises from having eaten too much grass in the spring-time. His curative measures were bleeding from the temples, and giving exercise moderately the first day. In winter it was necessary to clothe and to keep the patient in a warm stable. If he began to walk better, it was then advisable, if circumstances permitted, to let him go to pasture, or sprinkle his hay with fresh water, but only to allow food gradually. Barley-water could also be given with advantage. To know if a horse had fever, one had only to present him with oats or barley; if he ate, then was he only fatigued, for a feverish horse abhors food, is dull, and only cares to drink. He throws himself on the ground, and is scarcely able to rise. In bleeding it was necessary to take away the blood from veins which were not near nerves (tendons?), because if injured they suffer distension. 'If the disease increases in intensity, the horse dies in three days, not being able to support the violence of the fever any longer than that time. We ought not to believe those who pretend that they can recognize fever by touching the ears or the shoulders. We ought not to bleed the fatigued horse, because it weakens his strength, and may produce dangerous consequences. It is only necessary when the head is overcharged with blood, and the disease requires it.' He tells us that the

ignis sacer (gangrenous erysipelas or carbuncle) usually affected the back of the horse, and consisted of a tumour filled with matter, at other times a hard swelling, covered by a crust or scab. The treatment was to open it, dress with pomegranate powder, and poultice with meal. The next day pounded cypress leaves were to be applied, mixed with vinegar, after the wound had been washed. Cabbage leaves bruised in meal were to be used subsequently.[1]

Hierocles, a Greek hippiatrist, of whose work only three chapters remain, says that the horse is exposed to many kinds of fevers or plagues: one which runs its course in twenty-four hours, and is caused by excesses of any kind. It is an inflammation of the spirits, which affects the blood, and is cured by repose. The second fever begins by shivering, and finishes by perspiration. The paroxysms last only twelve hours, and when they go beyond that time it is termed bastard fever. To cure it, blood must be abstracted in larger quantity than authors indicate, and experience teaches that bleeding from the neck is very beneficial. Refreshing drinks are also efficacious. Much good results by keeping the bowels open by lavements of mallow, mercury, honey, &c. The next fever is one of a continuous nature, and pestilential, due to the presence of corrupt humours in the interior of the vessels, and which it was necessary to treat by blood-letting from the neck, and giving refreshing and cooling food, barley gruel, and enemas. Its cause is owing to too much phlegm in the system, in consequence of bad feeding. Horses too fat and flabby are usually attacked by it in the autumn, and it is difficult to cure. Moderate exercise is necessary for these cases, and the skin should be rubbed with hot oil; while their food should be stimulating and nourishing. This writer only notices the carbuncular disease spoken of by Vegetius as very dangerous to mares, and that it is necessary to dress the tumours, which are hard, and to bathe them with vinegar.

Another Greek veterinarian, by name Pelagonius, who lived about this time, imagines that horses had the pest from too much severe labour, by excessive heat, by great cold, sometimes

[1] *Apsyrtus.* Scrip. Græc. Vet.

from having suffered from starvation, at other times from having been put to full speed after a long rest, or drinking while hot and perspiring. His remedies were two. The first was an antidote, composed of myrrh, laurel leaves, scrapings of ivory, gentian, and other articles, mixed with wine, and given in doses until the horse was cured. The second smacks strongly of the disgusting quackery of a much later time. A cygnet was to be taken with its feathers on, and simmered in a pot until reduced to ashes. Of these, a portion was to be given in good wine, until the disease disappeared. Salt brine was to be administered at the same time by the nostrils. It was observed in the time of this writer that pestilential and contagious diseases often broke out among the horses of an army when on active service in the field, and were thought to be due to bad nourishment. But when these diseases broke out in time of peace, and in town and country alike, then were the causes more obscure, though they could generally be traced to improper or tainted forage, putrid water, and the foul atmosphere of stables. Much stress is laid in ascertaining the causes of these maladies, and nothing was to be left undone in discovering them. Then means were to be adopted for destroying the poison by medicaments—such as gentian, ivory raspings, laurel leaves, &c. If the horse was of a sanguine nature, he was to be bled from the jugular veins, and enemas were to be given. The symptoms of contagious diseases were similar to those of fever, only there was a drier and more furred mouth, and the breathing was more frequent.[1]

About this time St Jerome writes: 'We have seen in our days swarms of locusts over the land of Judæa, which were afterwards, through the mercy of God, driven by the wind into the first and last sea (*in mare primum et novissimum*—the Eastern and Western Sea). And when the shores of both seas were filled with heaps of dead locusts, the putrefaction and stench of them were noxious to such a degree as to corrupt the air, and produce a pestilence both among men and some kinds of animals (*pestilentia tam jumentorum quam hominum gigneretur*).'[2]

A.D. 443. The winter was dreadfully severe. So much snow

[1] La Veterinaria di Pelagonio. Podova, 1828.

[2] *Hieronymus.* Comment in Joel, chap. ii.

fell that it was scarcely dissolved in six months after; hence a great destruction of people and cattle.[1]

A.D. 444. A comet; repeated earthquakes in Turkey followed, and then fever, and, lastly, the plague most extensively. A great mortality among fish. The pabulum of plants seemed at length to be vitiated, and in England there was a great scarcity.[2]

A.D. 446. In September a severe earthquake, accompanied by disease and famine, at Constantinople. 'At this time a famine invaded Constantinople. . . . A great portion of the city walls with fifty-seven towers fell to the ground. Many cities were destroyed. Famine and the stench of the atmosphere killed a great number of men and a thousand oxen.'[3]

A.D. 466. A grievous famine prevailed in Britain, and a pestiferous smell in the air killed both man and beast.[4]

A.D. 484. There was such a drought in Africa that all the springs and rivers were dried up, and men and animals struggled for the withered grass roots in the open fields. So great was the famine, that all living creatures died in heaps, and their bodies lay in every road, without any one to bury them. There was neither dew nor rain, the earth was parched, no corn, vines, olives, or other fruits, nor leaves on any tree. Hence a grievous plague.[5]

A.D. 502. Scotland suffered very much from an epidemy and epizoöty, which killed great numbers of men and animals.

A.D. 547. St Filo fled from Wales, first to Cornwall and then to Armorica, 'on account of the pestilence which nearly destroyed the whole nation.' This disorder 'raged not only against men, but also against beasts and reptiles.'[6] 'There was a mortality in Britain and Ireland.'[7] During the yellow pestilence in Britain and Ireland, cattle were affected.[8]

A.D. 561. In Ireland 'a poisoned pool made its appearance in that region (Meath), through a chasm of the earth, and a vapour proceeded from it which produced a fatal disease in men and

[1] *Christ. Matth.* [2] *Nicephorus*, xv. 10.
[3] *Bede.* Eccles. Hist. ii. p. 66. [4] Baronius. [5] Ibid.
[6] Book of Landaff. [7] Cambrian Annals.
[8] Liber Landavensis. 'Mortalitas magna quæ dicebatur "crom conaille" vel flava scabies.'—*Tigern*, year 550.

beasts of burden.'[1] 'At that time a dreadful pestilence (*buidhe chonnaill*) was ravaging the common people.'[2]

A.D. 565. The whole world suffered more or less from epidemic diseases for a number of years. The Ligurian plague raged during this and the following years among mankind. Paulus Diaconus writes, 'Dwellings are vacant and towns deserted, men have disappeared, and there is a great destruction of animals.'[3] While the plague was at its height Nicephorus describes a strange fact. 'Certain little marks appeared on the doors and outsides of their houses, on their garments, and on their utensils; some white crusts of a peculiar deposition from the air adhered to all things as damp moulds do on the walls or dwellings, or dew on grass.'[4] This unhappy state of affairs was more particularly noted in France, Italy, and Germany.

A.D. 569. 'In this year a great disease, accompanied by dysentery and *variola*,[5] afflicted Italy and Gaul, and neat cattle especially perished in these countries.'[6]

A.D. 570. According to Marius, Bishop of Avranches, an epizoöty spread in France and Italy which destroyed nearly all the cattle. This may have been a continuance of that which is mentioned as occurring in the last year. A glandular affection also manifested itself among men.[7]

[1] St Ædus, vol. i. p. 422.

[2] St Brigidia, vol. ii. p. 536. In the ancient Irish records mention is often made of the *Buidhe Chonnaill*, which was a disease affecting both the human and bovine species.

[3] *Paul. Diacon.* Caps. iv. xxiii. *Muratori.* Scrip. Rerum Ital., vol. i. p. 426.

[4] *Nicephorus.* Hist. Eccles.

[5] Grave doubts are entertained as to the etymology of this word, and the question remains a disputed one as to whether it be the variolus disease that is here meant. Heusinger thinks that this variola, because it is mentioned with other maladies of a pustular and bubonic nature, was nothing else than the true plague, and he only believes in the appearance of small-pox at a much later period. There can be now no doubt, however, that the learned pathologist is incorrect: small-pox is frequently mentioned in the early Saxon writings, both by its common and Latin designations, and its presence in Ireland is indicated at a period not far removed from this mentioned by Marius. Hecker (*Annalen*, 1828) is, therefore, I think, quite justified in writing 'wir stehen nicht länger an die pustularfest im sechsten jahrhundert für pocken zu erklaren.' For the notices of this disease in early England refer to *Saxon Leechdoms*, London, 1866.

[6] *Marius.* Episcop. Chronicon. *Duchesne.* Scrip. Rer. Franc. vol. i. p. 215.

[7] Ibid.

A.D. 571. On September 24 there was a prodigious slaughter of wild fowl in a fight.[1]

A.D. 580. Great floods, tempests, earthquakes, hail, and other misfortunes, ushered in a dreadful plague of a dysenteric nature, and great loss of cattle, during the fifth year of the reign of King Childebert.

A.D. 581. There was in this year an epizoöty among the cattle in Touraine, which, according to Gregory of Tours, could not be prevented or cured until the Church interfered, when a religious ceremony had the wished-for effect in driving away the malady.[2] The same credulous worthy informs us that about this time an epizoöty also broke out among the horses of Bordelais, which would not cease its ravages until vows were made to St Martin, and the solipeds had their foreheads branded with a red-hot key, probably belonging to the church door.

A.D. 582. In Ireland 'great snow,—great cattle mortality.'[3]

A.D. 583. Inundations in France. 'A disease amongst cattle followed this inundation, so that scarcely one remained, and it was a novelty for any one to see an ox or a heifer in the land.'[4]

A.D. 584. 'Locusts in the province of Carpitania, which they laid waste for five years. In this year they departed by the public roads to another province. The hoar frost greatly damaged the vines, and a tempest of hailstones followed, which destroyed them, and also the crops in many places. A severe drought finished the work of the hailstorm. But little fruit was seen on some vines, on others none; so that men being wroth with the gods, threw open their vineyards, and the cattle trod all down. The trees which brought forth apples in July had a second crop in September. A disease of cattle invaded them a second time, so that scarcely one remained.'[5]

A.D. 589. Great floods in Italy, doing much damage. The Tiber overflowed its banks, deluged Rome and the surrounding country, drowning great numbers of men and cattle. On the

[1] *T. Short.* A General Chronological History of the Air, etc. London, 1749, vol. i. p. 73.

[2] *Greg. Tur.* De Mirac. St Martin, lib. iii. cap. 18.

[3] Annals of Innisfallen. [4] *St Gregory.* Francor. Histor. vol. vi. p. 31.

[5] Ibid. vi. *Bouquet*, vol. ii. p. 289.

disappearance of the waters, all the fields were found covered with slime and mud, the grain was all destroyed, and myriads of serpents and other creatures lay putrefying in the hot steaming atmosphere. This is supposed to have given rise to the plague which soon broke out in mankind and the lower animals.[1]

A.D. 591. A plague of locusts invaded Italy. They were supposed to have come from Africa. After eating up every green herb or leaf, they were, as usual, blown into the sea, and being washed on shore again, their putrefaction was the cause of disease, which killed nearly a million of men and beasts. Mankind in Britain, Turenne, and the provinces of Arragon and Vivares, suffered much from an epidemic named *inguinaria*, marked chiefly by buboes. St Gregory gives us the following account of an epizoöty which appeared in France and Belgium. 'In the second month of this year a great pestilence destroyed the people and a fearful drought ensued, which no kind of herb escaped; from this arose a grievous plague amongst cattle and oxen, which increasing, left scarcely any to breed from. Not only did this plague affect the domestic animals,—it also attacked wild creatures. The remains of a multitude of stags and other beasts were found dead in the forests. Forage was destroyed by the overflowing of the rivers and streams, and corn there was none. Vines, however, were heavily laden, but acorns did not attain their full development.'[2] Wirth is of opinion that the epizoöty was one of anthrax or 'milzbrand.'[3]

A.D. 605-6. In these years there was excessively hot weather with droughts, which gave rise to a famine, and consequent plague in mankind and in cattle throughout Italy.[4]

A.D. 661. 'After one year more, there was a great pestilence among the birds, so that there was an intolerable stench by sea and land, arising from the carcases of birds, both great and small.'[5]

A.D. 671. 'This year there was a great mortality among the fowls (*fugla val*).'[6]

A.D. 684. 'A mortality (*ar*-slaughter) upon all animals in

[1] *Baronius.* Imper. Hist. [2] *St Gregory.* Op. cit., vol. x. p. 30.
[3] *Wirth.* Lehrbuch der Seuchen und Ansteckenden Krankheiten der Hausthiere. Zürich, 1846, p. 85. [4] *Baronius.* Op. cit.
[5] The Chronicle of Fabius Ethelwerd. [6] Chronic. Saxon. Edit. *Gibson*, p. 41.

general throughout the whole world for the space of three years, so that there escaped not one out of the thousand of any kind of animals. There was great frost in this year, so that the lakes and rivers of Ireland were frozen; and the sea between Ireland and Scotland was frozen, so that there was a communication between them on the ice. Adamnan went to Saxon land.'[1]

A.D. 689. An epizoöty devastated the cattle of Ireland. 'It rained blood in Leinster this year; butter was turned into the colour of blood.'[2] 'It rained blood seven days together through all Britain; and milk, cheese, and butter turned to blood.'[3]

A.D. 694. 'A great morren of cattle throughout all England.'[4]

Hardyng,[5] narrating the distress in England about this period, writes:

> 'Their catell dyed for faute of fode eche daye,
> Withouten meate or any sustenance,
> In townes and feldes, and the common waye,
> Through which their infecte was by that chance,
> That multitude of folke, in great substaunce,
> On hepys laye full lyke unto the mountaynes
> That horrible was of sight above the playns.'

A.D. 695. 'The same morren of cowes came into Ireland the next year, and began in Moythrea, in Teaffia. There was such famyne and scarcitie in Ireland for three years together, that men and women did eat one another for want.'[6]

A.D. 696. 'A mortality broke out among cows in Hibernia, on the Kalends of February, in Magh Treagha, in Teathbha . . . Great frost in this year, so that the lakes and rivers of Erinn were frozen over, and the sea between Erinn and Alba was frozen to such an extent that people used to travel to and fro on the ice. Famine and pestilence prevailed during three years in Hibernia, to that degree that man ate man.'[7]

[1] The Annals of the Four Masters. [2] Annals of Clonmacnoise.
[3] Isac. Chronic. Clark's Mirrour. [4] Annals of Clonmacnoise.
[5] The Chronicle of John Hardyng, composed in the 14th century.
[6] Annals of Clonmacnoise. [7] Chronicon Scotorum.

A.D. 698. 'Cattle destruction in Saxon land.'[1]

A.D. 699. 'A mortality of cattle raged in Ireland in the Kalends of February, in the plain of Trego, in the region of Teffia,'[2] now Moytra, in the county of Longford. 'The mortality of cattle broke out on the first of the Calends of February, in Magh Tregha, in Tethbha.'[3] 'Destruction of black cattle in Saxonia (Saxon land).'[4]

A.D. 700, 701, 704, 707. 'A distemper of black cattle kindled in Ireland on the first of February, in the plain of Trego, in Teffia.' 'A mortality of cattle.'—*Bovina mortalitas.*[5]

A.D. 708. 'The plague which is called *Baccagn* (lameness), with dysentery in Ireland.'[6] The term Baccaen is sometimes applied to the *dry* murrain in cattle in this island. (Sir W. Wylde, *Census of Ireland.*)

A.D. 744, 747, 748. Snow of unusual depth, so that almost all the cattle of Ireland perished, followed in 744 and 748 by unaccustomed drought.[7]

A.D. 765. In Ireland, 'Great mortality among cows this year.'[8]

A.D. 770. 'There reigned many diseases in Ireland this year. A great morren of cows ran over the whole kingdom, called the *Moylegarou.*'[9] This is the first introduction of the term *Maelgarth,* a skin disease of cattle characterized by roughness and loss of hair, and which appeared frequently in after times. It is difficult to make out what malady is meant, whether it be scabies, erysipelas, or even the carbuncular form of anthrax.

[1] Annals of Clonmacnoise. [2] Annals of Ulster.
[3] Chronicon Scotorum. [4] Annals of Tighernach.
[5] Ibid. Annals of Ulster. Chronicon Scotorum, Edit. 1867. In early Irish history, epizoöties are defined as *Ar,* mortality: such as *Bo-ar,* cattle mortality, usually rendered by the early English translators of the annals, 'a murrain.' Occasionally the term *Dibhadh,* loss, or total failure, is applied to cattle pestilences; thus, one of the ancient kings is styled Breasal *Bo-dhibhadh,* 'Brassil of the cow-mortality,' because in his reign it is said nearly all the cows of Ireland became extinct. *Dith,* loss, want, destruction—applies to inanimate things as well as to mortality of men or animals.
[6] Annals of Ulster.
[7] Annals of Clonmacnoise. Annals of Ulster. Annals of Tighernach.
[8] Annals of Innisfallen. [9] Annals of Clonmacnoise.

A.D. 772. 'The murrain of the cows in Ireland still continued, and which was worse, great scarcity and penury of victuals among men continued. The pox (small-pox) came all over the kingdom.'[1]

A.D. 776. 'A great fall of rain and great wind. Dysentery (*Rith fola*) and many diseases besides. Mortality almost; the great mortality of cows (*Bo-ar-mor*).'[2]

A.D. 777. In Ireland, 'The running of blood (*Ritu-fola*, dysentery). The great mortality of cows (*Bo-ar-mor*).'[3]

A.D. 778. In Ireland, 'Mortality of cattle (*Bovum mortalitas*) ceased not, and the mortality of men from want. The small-pox (*Bolgach*) all over Erinn. A very great wind at the end of autumn.'[4]

A.D. 784. In Germany a severe drought, and a plague among men and animals.[5]

A.D. 791. Campaign of Charlemagne against the Huns, beyond the Danube, and in Bavaria and Austria. 'This expedition was accomplished without any mishap, except that in the portion of the army led by the king (while in Hungary) there broke out so great a plague among the horses that it is said scarcely a tenth part of the many thousands remained.'[6] We are left in doubt as to the nature of the malady.

A.D. 797. In Ireland, 'destruction of cows among the Momonians, Darians, and Adhuar, son of Nechin.'[7]

A.D. 798. In Ireland, 'great snow, in which much cattle and people perished.'[8]

A.D. 800. A great earthquake and a severe winter. Cattle epizoöties in various places, as well as epidemies. 'In this year the sea overflowed its boundaries, forgetting that which the Psalmist says, "I have placed this boundary, which shall not be transgressed." It caused great havoc among cattle in many parts.'[9]

A.D. 801. Earthquakes experienced in France, Germany,

[1] Annals of Clonmacnoise. [2] Annals of Ulster.
[3] Ibid. [4] Ibid.
[5] *Hagek* and *Liboczan*. Annal. Bohemor., vol. i. p. 348.
[6] *Einhardi*. Annal. Pertz., M. i. p. 177.
[7] Annals of Innisfallen. [8] Annals of Ulster.
[9] *Simon Dunelmens*. De Gest. Rer. Angl. *Twysden*. Scrip. His. Angl. p. 116.

and Italy. St Paul's, at Rome, was thrown down in the month of April. 'Plagues and epizoöties, following sanguinary wars, as well as shocks of earthquake, occurred in the realms of Charlemagne, soon after the crowning of that monarch.'[1]

Agobard, an archbishop of Lyons, who lived in the reign of Charlemagne, recounts the history of a great epizoöty among cattle in France. Its origin was attributed to Grimoald, Duke of Benevento, who, it was said, hated the Christian king, and sent emissaries with enchanted powders to sprinkle over the land; these powders were composed of a substance capable of killing animals. This poisonous ingredient was sprinkled over the pasture on mountain and plain, or on the cattle; even the springs of water were rendered deadly by it. Some of the men were seized, and, when tortured, confessed that they had been using powders to cause the death of the oxen; after which confession they were tied to planks and thrown into a river.[2] Such is the archbishop's version of the story.

The great mortality would lead one to infer that it was the real '*bovum pestilens*,' conveyed from the districts in which the great emperor had been conqueror, and where he had, no doubt, levied taxes in kind on the conquered. But poisons of this nature were often supposed to be propagated by wicked or stupid people, in ages of darkness, and even in those of more enlightened times. Indeed, it would seem that from the time of Thucydides to the present day, when a strange disease suddenly appeared, the masses have always entertained suspicions as to its mortal effects being due to poisonous substances introduced into the water, food, or air, by malicious people.

A.D. 804. In Bohemia, 'a plague raged not only in man, but in all kinds of animals, and attacked Mnata himself.'[3]

A.D. 809-10. A great epizoöty among cattle on the Continent. It came from the east and penetrated to the west.[4] A Saxon poet gives us the following description: 'On all sides the peace of the present year had gladdened the empire to its bound-

[1] *Metaxa.* Delle Malattie Contagiose ed Epizoötiche, etc. Roma, 1817. Vol. i. p. 133. [2] *Baluze.* Annal. de Franc. Year 801.

[3] *Hagek* and *Liboczan.* Annals of Bohemia, vol. i. p. 413.

[4] Chronicon Moissiac. Pertz, M. i. p. 309.

aries; but a certain sadness had touched many lands, for a very fierce pestilence destroyed every kind of cattle. Joyfully the shepherds drove their flocks and herds to the green fields, from whence, however, but a small portion returned, drooping and heavy, showing symptoms of disease and the near approach of death in their emaciated condition. The greater number lay stretched in the meadows, where they breathed forth their lives amid the sweet herbage. And now the pastures stink from the dead bodies spread out on them. . . . . The stables were cleansed with such great labour, that when they saw an animal sick and about to die they preferred rather to slay it. This they did with an iron instrument. Immediately from the bloody wound there flowed the poison which betrayed its effects throughout the whole body. Noricus and the neighbouring regions are said to have suffered most grievously from this plague.'[1]

This, in all probability, was another invasion of the dreadful 'Rinderpest,' which appears to have extended beyond Norica, and to have committed havoc in this country; for we read that 'eight hundred and ten was the year of Christ when the moon turned black on Christmas Day (according to Petrie and Sharp, "Monumenta Historica Britannica," this was in 809), and Menevia was burnt, and there happened the greatest mortality among horned cattle in Britain that is on record.'[2] 'A mortality among cattle in Britain (*mortalitas pecorum in Britannia*).'[3]

It would be most interesting if we could trace this disease in its progress to the British isles, but I think there can be no doubt whatever as to the existence of the 'Cattle Plague' in Britain at this early period. The Archives of the Imperial Agricultural Society of Southern Russia state that the disease at this period was imported from the Asian shores of the Black Sea into Europe. It appeared in Hungary and Illyria, and from thence spread rapidly throughout Germany, Austria, and Flanders, destroying enormous numbers of cattle. From thence it was probably imported into England.

[1] Poetæ Saxon. Annal. *Bouquet*, vol. v. p. 169, v. 236.
[2] Brut y Tywysogion, or Chronicles of the Prince of Wales.
[3] Annales Cambriæ.

The origin of the malady, or rather the cause of its spread, might be ascribed to the wars then occurring.

Indeed, we read for 810, that in the campaign of Charlemagne against the Northmen or Scandinavians on the Elbe and Weser, 'So great was the pestilence of oxen in this expedition that scarcely in the whole army did one remain, but all perished; and not only there, but a plague among animals, causing a dreadful mortality, broke out in all the provinces conquered by the Emperor.'[1] Elsewhere for this year it is noted: 'A very great mortality amongst oxen laid waste nearly the whole of Europe, and more especially Britain.'[2] In the Chronicle of St Denis it is mentioned that the oxen and the *bêtes aumailles* in France perished in great numbers.[3] Wirth[4] speaks of anthrax being prevalent in Germany, but it may have been this 'Cattle Plague.'

A.D. 820. Excessive rains and cold damp weather, with inundations and scarcity of food, in Gaul. War against the Sclavonians in Pannonia. 'In this year, on account of the perpetual rains and the moist state of the atmosphere, great evils occurred. For a pestilence soon spread both to man and beast, so that scarcely any part of the whole kingdom of the Franks escaped its ravages. The corn, also, and the leguminous plants were damaged by the continual rains. The grapes did not ripen; they were sour and unpleasant.'[5]

The 'Cattle Plague' appeared in Hungary, and after raging there with great violence, passed away to the west of Europe.[6] This may have been the malady mentioned above as devastating the kingdom of the Franks.

A.D. 823. A severe winter and a dry summer, with heavy storms. The snow lay on the ground for twenty-nine weeks, and caused great loss of human and animal life. Pestilence in the summer. 'In many places the crops were destroyed by hail-storms, and in certain localities stones of immense weight fell. . .

[1] *Einhardi.* Annales. Pertz, M. i. p. 198. Annal. Fuldens. Ibid. 1.
[2] *Higdeni.* Polychronicon. *Gale.* Scrip. Hist. Brit., i. p. 252.
[3] Chroniques de St Denis. Edit. *Pauline*, 1837.
[4] *Wirth.* Op. cit. p. 85.
[5] *Einhardi.* Op. cit. p. 207. Annal. Fuldens, p. 357.
[6] Archives Imp. Agric. Soc. of Southern Russia.

Men and other animals were killed by lightning. Then followed a great plague among men, which extended through the whole of France in a fearful manner, destroying multitudes of different sexes and ages.'[1] This plague of an unknown character extended to Germany, killing men and animals.

A.D. 829. 'There was a plague in Greece, Thrace, and Bulgaria, contemporaneously with an epizoöty among sheep.'[2]

A.D. 842. 'A dreadful famine and consequent mortality, with a "murrian" among cattle, caused great calamities throughout the world.'[3]

A.D. 850. Great mortality among the cattle in France, so that many provinces were nearly entirely cleared of their horned stock.[4] This appears to have been another invasion of the 'Cattle Plague,' which also ravaged Germany and Spain at this time.[5]

A.D. 860. The preceding winter was so severe that the Mediterranean was frozen over to such an extent, that carriages were driven on the Adriatic Sea. 'A severe winter and mortality amongst animals.'[6]

A.D. 866. 'This year a disease of animals took place, and in the third year afterwards a mortality followed in the human species.'[7]

A.D. 868. 'A comet, severe famine, and mortality of men and animals.'[8] This occurred in Germany, and nearly all over Europe, but France appears to have suffered most.[9] 'In this year the Northmen invaded England; and plundering the country, retired to York with their booty. A great famine, and a fearful mortality among cattle and the human race occurred.'[10]

A.D. 869. 'In the year of our Lord's incarnation 869, which was the twenty-first of King Alfred's life, there was a great famine (in England), and mortality of men, and a pestilence among the cattle.'[11]

[1] *Einhardi.* Op. cit. p. 212. [2] *Frari.* Della Peste, vol. ii. p. 211.
[3] *Odericus Vitalis.* Eccles. Hist., book i. cap. 24.
[4] *Belleforest.* Annales de France.
[5] Arch. Agric. Soc. of Southern Russia.
[6] Annales Sangallens. Pertz, M. i. p. 76. [7] Eulogium Historiarum.
[8] *Duchesne.* Vol. iii. p. 473. [9] Annal. Verdun.
[10] *Asser.* De Rebus Gestis Alfredi, p. 20. Edit. Oxon. 1722.
[11] The Chronicle of Fabius Ethelwerd. Chronicle of St Evroult.

A.D. 870. A hot and dry summer, and multitudes of locusts in France. 'A pestilence among cattle in some parts of France, which spread so rapidly as to cause great loss to many.'[1] Tempests of hail and lightning did great damage to people, cattle, and grain.[2]

A.D. 873-4. An invasion of locusts in Gaul.[3] A very severe and long winter, which destroyed great numbers of animals and men.[4]

A.D. 878. 'An eclipse of the moon in October. An eclipse of the sun in November. In Germany, a great plague amongst oxen, especially in the Rhine provinces. Soon after a pestilence appeared in man, which resembled that in cattle.'[5] A certain town in Wormacense, not far from the Palatinate of Ingalenheim, named Walahesheim, had wonderful things happen in it; for whilst dead animals were daily dragged from their stables into the fields, the dogs which were in this town, as is their custom, devoured the dead bodies by tearing them to pieces. On a certain day, however, nearly all of them being congregated in one place, they all went away, and so completely had they disappeared, that none of them, either living or dead, were ever found.'[6] 'A mortal pestilence amongst cattle, especially about the Rhine. Dogs and birds, which at first collected round the dead bodies, suddenly disappeared.'[7] This was in all probability an epizoöty of anthrax, and the carnivorous creatures were no doubt poisoned by feeding on the carcases. In Ireland, 'Great dearth (*ascolt mor*) of cattle-food in the spring; a great flux (*fluxus magnus*) in the autumn.'[8]

A.D. 883. A famine and plague in Italy, and in the following year a pestilence at Oxford, which also affected the cattle, slaying great numbers.

A.D. 886. 'This year pestilence in animals throughout the whole world.'[9]

A.D. 887. The previous year had been very wet, and there were great inundations. 'A very severe and tedious winter,

[1] Annales Fuldens. Pertz, M. v. p. 383. [2] Chronic. Magdeburg.
[3] *Reginonis.* Chronic. book ii. [4] Annal. Fuldens.
[5] Ibid. [6] Ibid. [7] Pistor. German. Hist., vol. ii. p. 570.
[8] Annals of Ulster. [9] Eulogium Historiarum.

also a plague amongst oxen and sheep extended beyond measure in France, so that scarcely any of these animals were left.'[1]

A.D. 888. The campaign of the Emperor Arnulph, or Arnold, of Germany, in Upper Italy, towards Friuli. 'In this march, great consternation was caused by the horses dying so rapidly, that the loss was unparalleled in history.'[2]

A.D. 894. Anthrax prevailed among animals in Italy.[3]

A.D. 895-7. The first recorded invasion of locusts in Britain and Ireland, preceded by bloody rain, and followed by a general scarcity, when great mortality of cattle and other animals occurred: the effects lasted thirteen years. All the authorities who mention it are Welsh. 'Provisions failed in Ireland; for vermin of a mole-like nature, each having two teeth, fell from heaven, which devoured all the food; and through fasting and prayer they were driven away.'[4] 'After this, anno 897, poore Ireland had another scourge; for, saith Caradoc Lhancarvan in his British Chronicle, and likewise Polichronicon, this country was destroyed by strange worms, having two teeth, so that there was neither corn nor grasse, nor food for man or beast, for all was consumed that was greene in the land for the season of the yeare.'[5]

A.D. 896. A dreadful famine and pestilence, caused by unseasonable weather, in Gaul, Germany, and Italy. Arnulph, on his return from Italy across the Alps, seems again to have had an epizoöty among his horses. 'The great plague amongst the horses increased, being aggravated by the extraordinary difficulties of the march; so that, contrary to custom, oxen were employed to draw the litters instead of horses.'[6] Wirth speaks of anthrax having prevailed on a most extensive scale amongst the domestic animals in Europe, and of its being without doubt transmitted to mankind, as an epidemy of this nature was prevalent.[7]

A.D. 897. Great famine in France and Germany, but especially in Bavaria. In England, disease in cattle and in men. 'In the summer of this year went the army, some into East Anglia, and

[1] Annal. Fuldens. [2] Ibid. [3] *Wirth.* Op. cit. p. 85.
[4] Chronicles of Wales. [5] *Hanmer.* Chronicle.
[6] Annal. Fuldens, v. [7] Op. cit. p. 85.

some into Northumbria; and those that were penniless got them ships, and went south over sea to the Seine. The enemy had not, thank God, entirely destroyed the English nation; but it was much more weakened in these three years by the disease in cattle, and, most of all, in men, so that many of the mightiest of the King's thanes that were in the land, died within three years.'[1]

A.D. 899. In Ireland, 'a rainy year; a great dearth; mortality of cattle.'[2] Rabies in a bear at Lyons, and singular escape of some men whom it had bitten. 'About the year 900 of our era immense forests covered Burgundy, Mâconnais, Brescia, and part of Lyonnais. These forests were tenanted by wild boars, wolves, bears, and other ferocious animals. One day, a mad bear, following the course of the river Saône, at last reached the quay at Lyons. Everybody fled at its approach, except some boatmen who, armed with heavy sticks, attempted to kill it. The bear, however, little intimidated by their number, rushed amongst them, and bit many—about twenty. Of this party six were smothered in about twenty-seven days, in consequence of fearful madness. The other fourteen, however, had thrown themselves into the river to escape the animal's attacks, and having to swim to the opposite bank, were thus preserved from the effects of the poison; the water of the river had saved them, for in beating against their wounds it had washed away the venom.'[3]

A.D. 903. In Ireland, 'great mortality of cattle and birds, so that the voice of thrush or blackbird was not heard this year.'[4]

A.D. 908. In Ireland, 'mortality of cattle.'[5]

A.D. 916. 'Great snow, cold, and unusual frost in this year, so that the chief lakes and rivers of Ireland were passable; and a destruction was brought upon cattle, birds, and salmon. Evil signs, too; the heavens seemed to glow with comets, a flame of fire arose, and passed from beyond the west of Ireland until it passed over the sea eastwards.'[6]

[1] Chronicles of the Saxons.
[2] Annals of Ulster.
[3] Messager de Provence.
[4] Annals of Innisfallen.
[5] Annals of Ulster.
[6] Ibid.

A.D. 918. In Ireland, 'great cold (*coisne*) and snow, which brought on mortality of cattle.'[1]

A.D. 929. A most severe winter, and the Thames frozen over.

A.D. 939. 'Kalend. Jun. die Sabbati hora nona flamma exivit de mari et incendit plurimas villas et urbes et homines et bestias, et in ipso mari pinnas incendit.'[2]

A.D. 940. An epizoöty among the cattle in France, Italy, and Germany.[3] Probably the 'Rinderpest.'

A.D. 941. An epizoöty of a deadly character in the north of Europe. Thousands of cattle died. 'A comet was seen, and an extensive mortality amongst the oxen followed its appearance.'[4] After this animal plague, which may have been the same as in the previous year, an epidemy broke out in man.

A.D. 942. Inundations, and subsequently a murrain among cattle in Germany.[5] 'A great famine throughout the whole of France and Burgundy, and extensive mortality among the oxen, which increased to such a degree that few remained in these countries.'[6] Comets appeared in the month of October, which lasted for twenty-one days, and after that time there happened a disease among oxen.'[7] 'In this year (941) a comet appeared in the western heavens. The year following there was a severe murrain among oxen throughout the whole of Germany, France, Burgundy, Aquitaine, and Italy, but it did not last long in the latter country.'[8]

In Ireland, a disease or 'fight' among birds. 'There was contention seen to be between the fowls of the sea and the fowls of the land at Clonvicknose, where there was a great slaughter of crows of one side.'[9]

A.D. 943. For this year we find the continental historians

[1] Chronicon Scotorum. [2] Chronicon Burgens. España Sagrada.
[3] *Herman.* Chronicon.
[4] *Reginon.* Chronic. Pistor. Scrip. Rerum German., i. p. 104.
[5] *Widukindi.* Lib. ii. Pertz, M. v. p. 446.
[6] Chronicon Frodoardi. *Bouquet.* Vol. viii. p. 196.
[7] Chronic. Monast. Florent. *Bouquet.* Vol. ix. p. 55. *Lobineau.* Hist. de Bretagne.
[8] Chronic. Andegav. *Bouquet.* Vol. viii. p. 252.
[9] Annals of Clonmacnoise.

mention the same events as in the previous year, and as occurring in the same countries.[1] Wirth speaks of the epizoöty in Germany as anthrax.

A.D. 945. 'There was in this year a furious mortality of people throughout France, caused not only by the famine and scarcity of food, but by an epidemic malady known as the 'faim canine.'[2]

A.D. 950. In Ireland, 'a mortality of bees.'[3]

A.D. 952. 'A destruction in Ireland through unknown insects having two teeth.'[4] Evidently locusts.

A.D. 953. 'A great destruction of cows throughout Ireland.'[5]

A.D. 955. 'There was a great dearth of cattle this year, and many diseases generally reigned all over Ireland, by reason of the great frost and snow, which procured the intemperature of the air.'[6]

A.D. 959. In Ireland, 'a bolt of fire passed southwards through Leinster, and it killed a thousand persons and flocks, as far as Athclaith.'[7] In 960, 'an arrow of fire came from the south-west along Leinster, and killed hundred thousands of men and cattle, with the houses of Dublin burned.'[8] To what extent the lightning caused this mortality cannot be surmised, but it is not improbable that the effects of epidemic and epizoötic disorders may be referred to, the lightning being used figuratively.

A.D. 960. A widely-spread destructive malady amongst cattle in the Roman territories. 'And in those days, even long ago, there went on both invading the land of the Romans, and ravaging and destroying the horned cattle, the infectious and pestilential affection which is called "crabra." And they say that this affection or disease took its rise in the days of the old Roman (Romanus I., Emperor of the East?); for when very near to the cistern or reservoir (κιστέρνης) of Bonus, the Roman was erecting, as a resting-place for himself, a summer palace (or

[1] Chronic. St Maxent. *Bouquet.* Vol. ix. p. 8.
[2] *Mezeray.* Hist. de France, 1685. Vol. i. p. 677.
[3] Annals of Ulster. [4] *Dowling.* Annals of Ireland. [5] Annals of Ulster.
[6] Annals of Clonmacnoise.
[7] Annals of the Four Masters. [8] Annals of Ulster.

palaces for the summer season), and they were laying the foundations, it was reported that there was found a marble ox's head, which the finders having broken up, cast into the lime-kiln. From that time, and up to the present, the breeds of cattle have not ceased to be destroyed in all parts of the earth wheresoever the Empire of the Romans extends.'[1]

In Ireland, 'A great (*plaigh*) upon cattle, with snow and diseases (*galar*).'[2]

A.D. 975. A severe winter and scarcity of food in London, and also in Italy. A comet was seen. 'In the time of this Edward (the martyr) appeared a blazing star, after which ensued many inconveniences, as well to man as to beasts, such as hunger, sickness, *murrain*, and other like calamities, but none of these things happened in the days of this Edward, but after his death.'[3]

A.D. 981. A *moilgarb*, or epizoöty of a cutaneous character, previously unknown in Ireland until 770, began, and preceded a most severe form of colic, called 'pestilential.' 'This year began the murrain of cows, called, in Ireland, the Moilgarbh.'[4]

A.D. 986. 'In this year first came the great murrain (*yrfcvalm*) among the cattle into England.'[5] 'A great sudden destruction, which caused a loss of people and cattle among the Saxons, Britons, and Gauls.'[6] 'And the same year there was a great murrain (*moreyn*) of cattle through all Wales.'[7]

'Godfrey, son of Harold, with the black host, devastated the isle of Mona, and two thousand men were blinded (captured?), and the remainder Maredudd, son of Owain, took with him to Ceredigion and Dyved. And then a mortality (*uarcolyaeth*) took place among all the cattle over the whole island of Britain.'[8]

What the nature of this very prevalent and destructive epizoöty may have been it is difficult now to conjecture; but from

[1] *G. Cedrenus.* Synop. Historiarum. Edit. Bonn, ii. p. 343.
[2] Chronicon Scotorum. The edition of 1867 gives 959 as the date.
[3] *Grafton.* Chronicles of the History of England. London, 1569.
[4] Annals of Clonmacnoise. [5] Chronic. Saxon. [6] Annals of Ulster.
[7] *D. Powel.* The History of Cambria, 1584.
[8] Brut y Tywysogion, or Chronicles of the Prince of Wales.

what is narrated for the subsequent year, it would appear to have been of a dysenteric character. What is worthy of note, however, in reference to the condition of comparative pathology and agriculture at this period, is, that though Wales often suffered from the evil effects of general diseases among animals, yet, from the earliest days of her written history, we find the ancient Welsh far in advance of other western nations in agriculture and the rearing and preservation of the domesticated animals. The state of their medical science is less known, and regret must be expressed that the Red Book of Hergest (*Meddygon Myddfat*) has not yet found a translator;[1] containing, as it may do, very much that would be of value to the student of medicine.

From her agrarian laws, which are greatly superior to those of France or Germany at that somewhat remote epoch, we find every provision made for equitable dealing in animals, and sometimes also a reference to important maladies of a sporadic or general kind. The laws of warranty appear to have been very wisely framed, and enumerate the chief animal disorders as follows:—[2]

'A horse is to be warranted against three disorders: against the staggers, for three dew-falls; against the "black strangles" (this has been literally translated, as the latter term is, at present, the appellation for that distemper. With the prefix "black," it may mean the "glanders"), for three moons; and against the farcy (the original "llynmeirich" appears to signify some disorder accompanied with serious humours) for one year.' 'The worth of a horse's foot is his full worth, and a third of his worth is an eye, and the worth of the other eye is another third. For every blemish in a horse, one third of his worth is to be returned, his ears and tail included.

'If a horse be sold in which there is a fault, but not visible on the skin, it is not to be compensated, unless it be one of the three natural disorders, but an oath is to be made of its not being shown.

[1] The MS. is now, I believe, at Oxford.

[2] These extracts are from the Laws of Howel the Good, which were revised about A.D. 1026.

'Whosoever shall sell a steer to another, it is right for him to be answerable for the three disorders incident to cattle; and, further, for the mange (*clauery*) until the feast of Saint Patrick. The person who shall buy it is to keep it in pasture, and in a healthy place, and in a building wherein no mange has previously occurred for seven years; and for the staggers three dew-falls.'

The teithi of a sow are, that she be not always brimming, and that she do not devour her pigs; and to be warranted three nights and three days against the quinsey (the original signifies some disorder affecting the throat). 'If the boar be gelded and die, his two testicles are worth two sows, and his carcase equal to another.'[1]

Sheep were to be warranted against the rot 'until the calends of May, when she shall have satiated herself three times with the new herbage.' (B. iii. c. 8.)

'Whoever shall sell a horse is to insure its *dilysrwydd* until death; and against the staggers, for three dew-falls; against the strangles, for three moons; against the farcy, a year; and, in addition, he is to insure it against any inward disorder.' (B. ii. c. 28.)[2]

'Whoever shall sell sheep, let him be answerable for three diseases: the rot (*y lledoro*), the red-water (*ar doris* or *douyr rud*), and the scab (*ar clauri*); until they obtain their fill three times of the new grass in spring, if he sell them after the kalends of winter.' (B. ii. c. 12.)[3]

'The judges of Howel the Good were not able to fix a legal worth on a brock: *for, during the year that the swine were affected with the quinsey,* it obtained the privilege of a dog (with regard to value), *and during the year that there was a madness among the dogs,* it then obtained the privilege of a sow.' (Gwentian Code, B. ii. c. 23.)

In other codes of about the same period we find, for pigs, the following:—

'Siquis uendiderit sues, debet esse sub tribus: id est, dýlýs-sruýt (evictione); et morbo menỳclauch (strumarum) tribus die-

[1] These are from the Venedotian Code.

[2] From the Dimetian Code.

[3] From the Gwentian Code.

bus et tribus noctibus, et ne comedant porcellos; et si comederint, tercia pars precii reddatur emptori, nec recambire debent inditio.'

And for sheep :—

'Signis oves vendiderit, debet esse sub dýlýssruýt (evictione); et sub dere (vertigine) tribus diebus et tribus noctibus; et sub llederu (morbo pulmonis) a festo Sancti Michaelis in autumno usque ad medium Aprilis, donec ter comederunt usque ad satietatem ac novis parellis in vere.'

'Agnorum venditor debet esse sub dilýssruýt (evictione); et sub dere (vertigine) tribus diebus et noctibus; et sub *Scabie* a festo Omnium Sanctorum usque ad Kalendas Aprilis; et sub llederu (morbo pulmonis) a predicto festo usque Kalendas Maii; emptor non debet ducere eos agnos *Scabiosos* septem annis ante.'

A.D. 987. An excessive drought and a most scorching heat during the summer. Bad weather brought a famine on many countries.[1] A serious epizoöty appeared among cattle in England in the form of dysentery, which caused a great mortality. Malignant fevers among the people. 'In this year two plagues of an unknown character appeared in England, to wit: fever among men, and pestilence among animals and men, which the English term 'scitta,' but which in Latin is known as dysentery (*fluxus*). These ravaged the whole of England, and the destruction to men and animals was quite incredible.'[2]

These pestilences appear to have prevailed in Ireland at the same time. 'Great and unusual wind. Preternatural (*i. e.* magical) sickness (*tregait Fithnaisi*, demoniacal colic), by demons, in the east of Ireland, which caused mortality (*ar*-slaughter) of men plainly before men's eyes.' 'The commencement of the great murrain of cows (*bo-ar mor*)—the strange "maelgarbh," which had never come before.'[3] 'A pestilence (*treghait*-colic) in the eastern parts of Ireland from demons, which caused a

[1] *Functius.* Chronicon.

[2] *Simeon Dunelmen.* De Gest. Reg. Angl. Scrip. Hist. Angl. (Twysden) p. 161. See also *Joh. Brompton.* Hist. Angl. p. 878. *Henry de Knyghton.* De Event. Angl., p. 2314.

[3] Annals of the Four Masters.

slaughter (*ar*) of people; and they used to be before the eyes of the people visibly (in daylight). The beginning of the great mortality of oxen (*bo-ar*), that is, the unknown "maelgarbh," having come for the first time.'[1] This expression Dr O'Connor translates 'scabies valde insolita.'

A.D. 992. A long and severe winter, and an extremely dry summer, followed by famine. The wheat crops were affected with blight or ergot, and the forage was generally of a bad quality. Soon after there was a widespread and deadly epidemy of ergotism (*feu sacré*) in France. In this year, in Germany, there was an extensive epizoöty of carbuncular fever in the lower animals.[2]

'A great mortality upon men (*duine-badh*), cattle, and bees in Ireland this year.'[3] Bees were largely kept in Ireland at this time, and were a great source of wealth to the people.

'After these great troubles, there followed within a year after such famine and scarcitie in South Wales, that many perished for want of food.'[4]

A.D. 994. 'A very rigorous winter, commencing on the 11th November, and lasting till the 11th May. Pestilential and cold winds blew, and heavy dews fell. Towards the middle of July there was a great frost, and so severe was the drought, that the fish died in many pools, and numbers of trees withered. The flax and corn perished. A terrible plague broke out amongst men, pigs, and sheep. In this year a grievous famine in many parts of Saxony.'[5] In France ergotism (*feu sacré*) was prevalent.

A.D. 995. A comet was seen this year in England. A deadly form of dysentery attacked man and beast, and proved most destructive.[6] It was 'a worse year in Saxony than the former, for so great a pestilence, which was named *Osterludi*, raged amongst them, that not only their houses, but many of their towns, remained empty, their inhabitants being dead.'[7] 'A

[1] Annals of Tighernach.

[2] *Spangenberg.* Op. cit. *Fabricius.* Origines Saxon, p. 218. *Wirth.* Op. cit. p. 85.

[3] Annals of Ulster. [4] *D. Powel.* Hist. of Cambria.

[5] Annales Quedlinburgens. Pertz, M. v. p. 72.

[6] *Short.* Op. cit. p. 93. [7] Annal. Quedlin.

notable year for its drought, many people and cattle dying of thirst.'[1]

A.D. 1014. 'In the previous year there had been many precursory celestial signs, omens of strange import, which were verified this year in Bohemia, where there was a fearful heat and drought. During the whole of the spring, and for nearly the whole summer, the weather was hotter than molten lava; the plains and the beautiful woods were scorched by the heat of the sun. The rivers were dried up, the springs were exhausted, the lakes and ponds were corrupted and putrescent, many people perished, as well as the greatest part of all kinds of animals. Especially did immense numbers of fish die.'[2]

A.D. 1015. In Ireland, 'a disease of the legs (*Cos ghalar*, probably scurvy) among the Danes, and a plague of rats (or mice, *Luch*) among the Danes and the Leinstermen.'[3] The term *Luch* is applied indiscriminately to rats or mice. The word '*Narraway*' is still used by the Irish-speaking people for the modern brown rat, which, it is believed by naturalists, replaced the old Irish black rat. They were probably introduced by the Scandinavian vessels, then so numerous on the coasts of Ireland. The Chronicon Scotorum gives the year 1013, as the date of this occurrence. Mr Wenessey thinks that the irruption of rats should be translated a plague of putrefaction among the foreigners and Lagenenians.

A.D. 1016. In Ireland, 'great mortality of cattle on account of the excessive rains.'[4]

A.D. 1022. A most unfortunate year, in which a great mortality prevailed amongst animals, and pestilence in mankind. Fruits and plants were destroyed,[5] and in Spain there was an invasion of locusts.

A.D. 1028. 'In the present year an invasion of cicadæ and caterpillars in Bohemia, following a very plentiful harvest. Innumerable swarms of butterflies also appeared, so that everything green in garden and field or in the woods was devoured. Dense and foul-smelling vapours had preceded this visitation,

[1] Annal. Sangall. [2] *Hagek* and *Liboczan*. Annal. Bohemor., v. p. 74.
[3] Chronic. Scotorum. [4] Annals of Innisfallen.
[5] Mirac. Veroli. Presbyt. Acta Sancta. Bolland., p. 385.

rising as they did about Easter, when the spring was coming in. After these insects had eaten everything up, they themselves increased the stench; the trees, also, stripped of their leaves, died and rotted. As a consequence, there was great mortality amongst men and animals, but especially in dogs, in the autumn.'[1] England and Gaul, and indeed the whole of Europe, suffered in the same way, and from the same causes.

A.D. 1030. In the old translation of the Ulster Annals in the British Museum it is recorded—'Maelduin Mac Ciarmaic, (who had profaned the effigy of) the Lady Mary, of Kindred Binni of Glans, killed by the disease that killeth cattle, in Irish called *Conach*.' If this be a correct translation, which is disputed, it would be the earliest instance to be found in the Irish annals of mankind being affected by the diseases of animals. It is difficult to make out the disease, however, for the term *Conach* has had its origin in the popular belief, not yet extinct, that horned cattle, if they eat the grass over which the *Conach* or *Connough Worm* (the large fleshy caterpillar of the *Sphinx Elephas* moth) has passed, become afflicted with a fatal distemper characterized by madness, a sort of hydrophobia.[2]

A.D. 1035. A very severe winter, the summer extremely dry. 'This year there was an unheard-of loss amongst animals, and this, with the destruction of bees, afflicted the whole of Bavaria.'[3] The weather was so cold in England, in June, that all the corn and fruit was destroyed.

A.D. 1040. In Ireland, 'abundance of produce (*mess mor: fructum abundantia*) this year, and mortality of cattle and swine.'[4] This is the first epizoöty specially mentioned as affecting swine in Ireland.

A.D. 1041. Most unpropitious weather, accompanied by earthquakes, tempests, and inundations. It snowed heavily

[1] *Hagek* and *Liboczan*. Op. cit., vol. v. p. 152.

[2] There is nothing at all astonishing in this relation of the Irish chief dying from some cattle malady, probably anthrax. Such cases must have been extremely frequent, if the ancient records are to be received as proof. Anthracoid erysipelas (*oman* or *homan*) may have been one of those forms of anthrax which affected men and animals in this country.

[3] *J. Staindelii*. Chronicle of Œfele. Scrip. rer. Boic., vol. i. p. 472.

[4] Annals of Innisfallen.

during harvest time; in many parts of Europe there were heavy rains throughout the year. Flanders was inundated by the sea, and there were great storms. The consequences of these disturbances were famine and disease in England, Germany, and France. Cattle and men appear to have suffered equally. 'The plague of Divine Fire (*ignis divina*, ergotism or erysipelas) afflicted many, who were only saved through the merits of the blessed Virgin.'[1] 'And in all that year it was very sad in many and various things, both in tempests and in earth's fruits. And so much cattle perished in this year as no man before remembered, both through various diseases and through bad weather.'[2] (Refer to 1044.)

A.D. 1044. An eruption of Mount Vesuvius. In Germany, 'Plague in cattle; the winter very severe, and heavy snows fell.'[3] 'There died at this time (1043), in this neighbourhood, many people, and there also reigned a special epizoöty amongst cattle.'[4]

For Ireland we read, 'Clonmacnoise was plundered by the people Conmhaicne (County Longford), whereupon God and Ciaran sent upon them the unknown distemper (*Tamh anaithinidh*), which killed almost all their people and cattle.'[5]

A.D. 1046. 'And this same year after Candlemas (Feb. 2nd) came the severe winter with frost and snow, and with all kinds of heavy weather, so that there was no man alive who could remember so severe a winter as that was, both through mortality of men and murrain of cattle; both birds and fishes perished through the great cold and hunger.'[6]

A.D. 1047. On January 1st there fell in the West of England a very great and deep snow, which broke down most woods. It lay till March 1st. The ensuing summer had such tempests of thunder and lightning that the growing corn was burnt and blasted, and several towns the lightning reduced to ashes. There

[1] Chronic. St Bavonis. Corp. Chronic. Flandr., i. p. 385.
[2] The Anglo-Saxon Chronicle. [3] Chronic. Ursperg.
[4] *Spangenberg.* Op. cit.
[5] Chronic. Scotorum. See also, Annals of the Four Masters. Annals of Clonmacnoise.
[6] The Anglo-Saxon Chronicle.

followed a great dearth, and death of people and cattle.[1] On March 1st there was an earthquake. The great mortality followed.

In Ireland it is mentioned: 'Great snow this year from the festival of Mary in winter (8th Dec.) to the festival of Patrick (7th March), the like of which had not been known; with a destruction of men, cattle, and of the wild animals of the sea, and birds.'[2]

A.D. 1048. An eruption of Vesuvius. In Germany swarms of mice appeared. Earthquakes occurred in many parts of England and Scotland. 'And in this year was also an earthquake, on the Kal. of May (May 1st) in many places, at Worcester, at Wick, and at Derby, and elsewhere; there was also a great mortality among men, and a murrain among cattle, and the wildfire (*ignis aërius vulgo dictus sylvaticus*) also did much evil in Derbyshire and elsewhere.'[3]

A.D. 1054. Famine in Germany. Cedrenus[4] writes: 'A pestilential disease smote the country, so that the living had not strength to bear away the dead, and this great affliction was endured throughout the whole summer. Not only were many men destroyed by it, but also animals.'

England appears also to have suffered. 'And in this year was so great a murrain among the cattle as no man remembered for many winters (*vintrum*) before.'[5]

A.D. 1059. For Bavaria it is recorded: 'In this year there was an abundant harvest of corn and grapes, but a direful plague smote man and beast throughout the whole province.'[6]

A.D. 1060. In Ireland 'a great storm in the autumn of this year, and very great destruction of crops. In this year foxes were taken among the herds, and in such numbers as the people chose, on account of the great number of dead carcases.'[7]

A.D. 1078. 'Snow and great frost, so that the principal rivers and lakes in Ireland were passable dry-shod. Great mor-

[1] Ranulf. Hilgd.
[2] Annals of Ulster.
[3] *Simeon Dunelmen.* Op. cit, p. 183.
[4] *Cedrenus.* Hist. Comp., ii. p. 609.
[5] Saxon Chronic.
[6] *Staindelii.* Chronic. Œfele Scrip. Boic., i. p. 477.
[7] Annals of Innisfallen.

tality of cattle in this year (*ar mor fors na-cearthra*). Great mortality among the people (*mortlaid mor*) of Ireland, and the cattle, which carried off a great number of men. Great store of the fruits of the earth this year.'[1]

A.D. 1084. In Ireland pestilence in mankind, possibly typhus fever, began, and continued for thirteen years. It was believed to be caused by demons (the demons of pestilence). 'This is the best year that came for its fertility in fruits and crops. Great mortality amongst cattle in this year, in the southern half of Ireland, called the half of Mogha (Munster).'[2]

A.D. 1085. Epidemic erysipelas (ergotism?) in France, with inundations and famine. 'In the year 1085 there was disease in plants and also in animals throughout the world.'[3]

In England, intemperate weather and a great death of cattle.[4]

In Ireland, 'there was destruction of men and cattle in this year to such an extent that rich men were made husbandmen in it.'[5]

A.D. 1086. 'There was a very severe season, and a swinkful and sorrowful year in England, in murrain of cattle, and corn and fruits were at a standstill, and so much untowardness in the weather, as a man may not easily think. So tremendous was the thunder and lightning, that it killed many men.[6]

Hemingsford says that sheep as well as cattle suffered from the great intemperature of the air.[7] Several other old chroniclers speak of this unfortunate season.[8]

A.D. 1087. The misfortunes of England were continued in the form of famine and disease.[9] Rain fell incessantly, the crops were destroyed, and great multitudes of people and animals perished. 'About this season, the people in all places were

[1] Annals of Innisfallen. [2] Ibid.
[3] *Königshofen.* Elsassiche und Strasburgische Chronic.
[4] Chronic. Saxon. *Stow.* Annals.
[5] Annals of the Four Masters. [6] Chronic. Saxon.
[7] *Walt. Hemingsford.* Chronic. *Gale*, ii. p. 461.
[8] *H. de Knyghton.* De Event. Angl. *Twysden*, p. 2353. Annal. Waverleiens. *Gale*, ii. p. 133. *Will. Malmesbury.* De Gest. Reg. Angl. p. 62. *Grafton.* Chronic. p. 16.
[9] Annal. Waverleiens.

A.D. 1111. According to Holinshed, a dreadful plague visited London, which not only caused a terrible mortality amongst its citizens, but extended itself to cattle, fowls, and other domesticated animals. 'About the same time many wonders were seen and heard of. The river of Trent, near to Nottingham, for the space of a mile, ceased to run the wonted course during the time of four-and-twenty hours, so that, the channel being dried up, men might pass to and fro dry-shod. Also a sow brought forth a pig with a face like a man, and a chicken was hatched with four feet. Moreover, a comet or blazing star appeared in a strange sort, for rising in the east, when it once came aloft in the firmament, it kept not the course forward, but seemed to go backward, as if it had been retrograde.'[1] 'In this year there was a very severe winter; the people died in great numbers; the loss of cattle was great; all domestic animals suffered. Birds were destroyed in great numbers.'[2] In Ireland, 'extreme ill weather of frost and snow, which made slaughter of tame and wild beasts.'[3]

A.D. 1112. In England, 'this yeare was a great mortalitie of men, and morein (murrain) of beasts.'[4]

A.D. 1113. In Ireland, 'a great mortality of cows. O'Longan, Erenach of Ardpatrick, was killed by lightning on Cruagh Patrick.'[5]

A.D. 1115. 'In this year (in England) there was so hard a winter, with snow and with frost, that no man living ever remembers a harder, and through it there was a great cattle plague.'[6] Cattle, birds, and people also perished in Ireland.[7]

A.D. 1124. 'There was on the third of August an eclipse of the sun, which was followed by a great pestilence amongst oxen, sheep, pigs, and bees. Even the crops failed.'[8] The winter was so severe that fishes in ponds, and even eels, were killed. After this there was a severe famine in England, and destruction of men and cattle.

[1] *Holinshed.* Chronicles. Saxon. Chronic., p. 217.
[2] *Simeon Dunelm.* De Gest. Reg. Angl. *Twysden.* Scrip. p. 234.
[3] Annals of Ulster.
[4] *Stow.* Chronicles of England.
[5] Chronic. Scotorum.
[6] Chronic. Saxon., p. 219.
[7] Annals of the Four Masters. Chronic. Scot. Annals of Boyle, &c.
[8] *Cosmae.* Prag. Chronic., book iii.

A.D. 1125. Severe weather. Pestilence in men and cattle throughout nearly the whole of Europe, with famine. In England, 'in this same year were such great floods on St Lawrence's mass day, that many towns and men were drowned, and bridges broken down, and corn and meadows spoilt withal, so that there was famine and plague amongst men and on beasts, and in all fruits so great untimeliness as had not been for many years before.'[1]

A.D. 1127. The 'divine plague' (ergotism?) appeared in mankind in France. Prayers to the Virgin Mary healed the afflicted, it is recorded. Great pestilence amongst animals.[2]

A.D. 1129. Heavy snow and rain in January. Great inundations. Plague in oxen, cows, pigs, bears, stags, and goats. The *ignis divinis* in man over a large portion of Europe.[3] For Ireland it is recorded: 'A "maelgarbh" (murrain) in this year which killed the cows of Erinn, and its pigs, except a very few.' And for 1130: 'The same destruction (distemper) as in the previous year, on the cattle of Lethchuinn.'[4]

A.D. 1131. Mortality amongst the domestic animals over the whole of England, which continued for some years, so that there was scarcely a farm which was free from the plague. The pigsties were emptied, and the stalls of oxen were deserted.[5] William of Malmesbury says: 'In the 31st year of King Henry a dreadful murrain among domestic animals extended over the whole of England. Entire herds of swine suddenly perished; whole stalls of oxen were swept away in a moment; the same contagion continued in the following years, so that no village throughout the kingdom was free from this calamity, or able to exult at the loss of its neighbours.' Another historian says: 'This year there was so great a cattle plague as never before was in man's memory, over all England. It affected oxen and swine as well, so that in a town where there were usually ten or twelve ploughs at work, there was now not one left, and the man who owned two or three hundred swine, often lost them all.

[1] Saxon Chronicle, p. 229.
[2] *St Bavonis.* Chronicle. [3] *Anselm Gemblac.* Chronic. Pistor.
[4] Chronicon Scotorum. Edit. 1867.
[5] Annals de Margan. *Gale.* Scrip., ii. p. 6.

At this time also died the hen fowls (*henne fugeles*), and now grew scant the flesh meat, the cheese, and the butter.'[1]

A.D. 1133. 'A destruction of cows (*bodhiobhadh*) came into all Ireland, the like of which was not known since the former destruction of cows in the time of Flaithbheartach, son of Loingsech, and there were 432 years between them.'[2]

'A *maelgarbh* this year, which killed the cows and swine of Erinn, excepting a trifle.'[3]

A.D. 1134. 'The same cow-mortality still devastates Ireland.'[4] In France, the air was so intemperate that birds fell dead. Flanders and the neighbouring countries were inundated by the sea during this and the next year, so that great loss in human life and in cattle was sustained.'[5]

A.D. 1142-3. Tempestuous weather in England, which induced a desolating famine that lasted for twelve years. At this time immense swarms of what were called small flying worms, which darkened the sun, appeared. These ate everything up. From a *bad air* a sore plague arose on man and beast.[6]

A.D. 1149. A snowy and severe winter, on which account the grain was destroyed in the fields by snow. An epizoöty in Belgium. 'In our land, by some death-bringing contagion or pestilence, sheep, oxen, and all kinds of cattle were hurried away by death. Wherefore I have devoted one-fourth of my herd of cattle to the blessed Gerlacus.'[7] In Germany, a great mortality among cattle, which in the pastures and sheds suddenly fell and died.[8]

A.D. 1151. 'Inundations and heavy rains, followed by a most grievous pestilence among men and cattle. Failure of the crops, and consequent famine of a dreadful kind.'[9] From this time till 1169, there were severe winters and dry summers, and famine and pestilence swept the world, but especially did Scot-

[1] Chronic. Saxon. *Barnes.* Hist. Edward III. Eulogium Historiarum.
[2] Annals of Kilroonan.
[3] Chronic. Scotorum. *See also* the Annals of the Four Masters.
[4] Annals of Kilroonan.
[5] *T. Short.* Op. cit., vol. i. p. 117.
[6] *T. Short.* Op. cit., vol. i. p. 119.
[7] Acta Sanctor. Bolland, Jan. 2, p. 318.
[8] *Spangenberg.* Op. cit., 258.
[9] Chronogr. Saxo. *Leibnitz.* Access. Hist., vol. i. p. 304.

land, Ireland, Italy, Gaul, Sicily, Judea, Asia, and Africa suffer.

A.D. 1154. 'There was a great destruction of the cattle (*indilibh*—cattle in general) of Ireland this year. The second Henry was made king over the Saxons on the 27th of October.'[1]

A.D. 1162. Great tempests. The sea inundated Friesland to an extent never before known, drowning thousands of people and cattle. At the same time hail made fearful havoc among men, beasts, trees, and horses. There was a famine in Poland. In Mediolana fell twelve great snows, which greatly afflicted both animals and vegetables. In June it rained blood. Famine and plague in Aquitania.[2]

A.D. 1166. In Saxony, 'heavy storms of thunder and lightning, and inundations about harvest time. Plague and mortality in children and beasts of burthen.'[3]

A.D. 1171. Inundations destroyed the crops in many places. Quadragesima suffered most severely. Disease in cattle, sheep, and men throughout Germany. Every place was filled with the dead bodies of men and cattle.[4] On December 25th, terrible thunder and hail in England, which killed birds, beasts, and people, in England, Scotland, Ireland, and France.'[5]

A.D. 1172. The English king, with his army, returning to England, brought with them dysentery, caused, it was said, by eating too much fresh fish and flesh. This disease spread over the whole of England. It was, however, prevalent in other parts of the world.[6] The Spanish chronicles say: 'There was a great famine over the whole earth, such as had never been seen since the creation. It was greatly deplored by all men, for there was constant death throughout the world both in man and beast.'[7]

A.D. 1173-4. To veterinary surgeons it may be interesting to know that at this period history affords us the first intimation of 'influenza' in the human species. 'This year the whole

[1] Annals of the Four Masters.
[2] Chronic. Magdeburg.
[3] Chronogr. Saxo. *Leibnitz.* Access. Hist., vol. i. p. 308.
[4] Chronic. Magdeburg. *Hoffman.* Annal. Bamberg.
[5] *T. Short.* Op. cit., p. 124.
[6] Ibid.
[7] Chronic. Conimbric. España Sagrada, vol. xxiii. p. 334.

world was afflicted with a cloudy corrupt air, which occasioned a most universal cough and catarrh fatal to many.'[1]

A.D. 1176. There was a great inundation of the sea in Holland, and in Lincolnshire, which drowned much cattle and many people. A storm of blood-rain fell over the Isle of Wight for two hours.[2]

A.D. 1178. A blood shower in England. A comet was seen; and the next day, on the west, a few hours after, a shower of great hail killed men, sheep, and goats.[3] 'To the 5th July, '78, the weather was moderate. Rains then came on until January, which prevented agricultural operations. In September there was an eclipse. In the following spring very hard weather. Forage was excessively dear, and, as a consequence, there was very great loss among sheep and cattle.'[4]

A.D. 1187. Great floods and inundations in Britain.[5] There was a grievous and pestilent mortality of men and cattle in England.[6] An unusual conjunction of planets in *Libra*, and the people being then addicted to astrology, got frightened, and a fast was ordered by the Archbishop of Canterbury.[7]

A.D. 1188. In England, 'there was a dreadful tempest of wind, rain, thunder and lightning, and hail fell in masses as large as pigeons' eggs. The sea overflowed its banks to a great height, and killed much people and cattle.'[8]

A.D. 1200. 'About this time (in Portugal, from 1185 to 1211) a disease never before seen sprang up. The viscera of mankind were disturbed as if by some raging heat, which caused raving as if of madness. A famine arose from the destruction of corn by tempests and vermin, and a plague not less destructive to cattle than to man appeared, so that the stables of many were left empty.'[9]

A.D. 1201. In England 'the spring had glutting and con-

[1] *T. Short.* Op. cit., vol. i. p. 125. Chronogr. Saxo. p. 310. Ymagines. Hist. *Twysden.* P. 579.

[2] *Speed.* History of the Isle of Wight. [3] *T. Short.* Op. cit., p. 126.

[4] *Anselm. Gemblac.* Chronic. Pistor. Scrip., vol. i. p. 986.

[5] Chronic. Saxon. [6] *Benedict Abbas.*

[7] *Forster.* Atmospherical Origin of Disease, p. 147.

[8] *T. Short.* Op. cit, p. 129.

[9] De Vera Reg. Portugal. Hispañia Illustrata, vol. ii. p. 1257.

tinual rains and very great floods. On June the 25th and July the 10th were great tempests of thunder, lightning, hail as big as eggs, and prodigious rains, destroying corn, cattle, people, meadows, &c. The rains continued from Pentecost to Nativity of the blessed Virgin, which not only hindered corn and fruits from ripening, but rendered them mostly useless and unprofitable. A great dearth of animals followed, but chiefly of sheep.'[1] Possibly from dropsy or 'rot.' For the previous five years, the *ignis sacer* had been widely prevalent on the continent and in England, in mankind, coincidently with *rust* of plants and famine.

A.D. 1202. 'This winter (after the great summer rains of 1201) was severe beyond any in the memory of man for extreme cold and long continuance. After the frosts followed the like tempests of thunder, lightning, rain, and hail as big as hens' eggs, destroying corn, fruit, young cattle and horses, &c.'[2]

A.D. 1207. In Ireland 'a great destruction (*dith*) of men and cattle this year.'[3]

A.D. 1213. Gangrenous erysipelas (*feu sacré*) in mankind in France and Spain. 'Neither was the scarcity limited to the fruits of the earth, nor disease to the human species; for birds, cattle, and sheep became sterile and brought forth no young, and many riding and other horses perished for lack of straw and barley.'[4]

A.D. 1217. The drought was so great as to ruin the harvests in Spain, and to burn up all the pasture. There was consequently a famine, with pestilential disease in men and cattle.[5] In Italy there raged a fearful plague in the human species, which left scarcely a tenth part of the inhabitants alive.

A.D. 1221. This year were continual great rains all the summer in Poland; hence such great floods, that many villages were swept down, the winter corn was lost, and there was no sowing in the spring; a sharp horrid cold winter followed, then came three years' famine and plague, whereof died myriads of people and cattle.'[6]

[1] *T. Short.* Op. cit., p. 133. [2] Ibid. [3] Annals of Ulster.
[4] *Villalba.* Epidemiologia Española, vol. i. p. 54.
[5] *Zurita.* Vol. i. p. 108. *Villalba.* Vol. i. p. 57.
[6] Chronic. Magdeburg.

A.D. 1223-25. From the beginning of this century till 1241, the Mongol invasions from Asia, through Russia, to Silesia, took place, and it has been correctly conjectured, I think, that these irruptions were the cause of many epizoöties being introduced into the western hemisphere. These maladies, especially those occurring in 1222, 1233, and 1238, are supposed to have been *the* Cattle Plague, or 'Rinderpest.' 1223. In this year there was a very great epizoöty of cattle, which seems to have begun in the east, and to have spread, by way of Hungary and Austria, into Italy, Germany, France, and England.[1] 'In the year 1223, there was a great mortality among cattle, but grain crops were not affected. It lasted three whole years, and the greater portion of the cattle died.'[2] 'A great death of sheep in England.'[3]

A.D. 1224. In Ireland, anthrax appears to have been very fatal. 'An awfully great and frightful shower fell in parts of Connaught this year, *i. e.* the Hy-Maney, and in Sodan, and in Hy-Diarmada, and in Clannteige, from which grew a very great mortal distemper (*Teidhm galair*) to the cows and cattle of the aforesaid territories, after eating of the grass and herbage, and in the people who partook of their milk or flesh it produced various belly (or middle) sicknesses.'[4] 'Their milk and flesh produced various distempers in the people that partook of them. A great mortality of people in this year.'[5] A great war raged in Connaught this year, 'and after the slaughter and destruction of the cattle, and the people of the country, and after driving them out to cold and hunger, a severe and mortal disease grew up in the whole country, namely, a species of *Teasca* (probably typhus), through which towns were emptied without leaving a single person in them; some recovered, but they were few.'[6]

A.D. 1233. Thunder and lightning for thirteen days in England, with heavy rains. All the vegetation was destroyed, and as a consequence famine and disease prevailed.

'In this year so terrible a cattle plague broke out, commencing in Hungary, and spreading into this and more distant lands,

[1] *Conrad.* Cœnobit. Schyreus. *Trithem.*
[2] *Königshofen.* Els. Chron. p. 302. [3] *T. Short.* Op. cit., vol. i. p. 139.
[4] Annals of Connaught. [5] Annals of Kilroonan. [6] Ibid.

that nearly all the cattle died, and one scarcely knew where to obtain more.'[1]

A.D. 1234. Aventinus speaks of a great epizoöty (*magna pestis pecudum*) among cattle in this year.[2] Probably it was a continuation of that mentioned for last year.

A.D. 1235. 'Tristan Calcho, the historian, informs us that a pest broke out among quadrupeds, and was destructive to nearly every beast of burden. Amongst birds it was particularly destructive to domestic fowls.'[3]

A.D. 1238. 'A severe and dreadful winter. . . . Afterwards a plague broke out among birds, and chiefly amongst fowls. Oxen and many other useful beasts suffered greatly.'[4]

A.D. 1240. Disease (?) attacked the fish on the coast of England, and pestilence raged in various parts of the country. Short writes:—'For about four months together, it scarcely ever ceased raining, but about Easter it began to take up, turn clear and fair. Then three months' drought caused great famine to follow. In February appeared a comet which continued for thirty days. Sore and heavy diseases on man and beast. There was also a great battle among the fishes on the English coast, by which eleven whales and multitudes of other large monstrous fishes were cast on the shore dead.'[5] The battle amongst the fishes was an ignorant way, no doubt, of accounting for the mortality amongst these denizens of the deep.

In this year, according to the Archives of the Agricultural Society of Southern Russia, the Cattle Plague appeared in Hungary, and spread throughout nearly the whole of Europe.

A.D. 1248. 'A plague and great famine in Britain and Ireland.'[6]

A.D. 1249. Inundations were so frequent in Friesland that agricultural operations were greatly retarded. Famine ensued, and a disease broke out amongst cattle which nearly destroyed them all. Mankind afterwards suffered from pestilence. This state of affairs continued throughout the next year, and it was

[1] *Walser.* Appenzeller Chronik. p. 154.
[2] Annal. Boj., p. 637.
[3] Miscellan. Medic. Curios. Col. Agripp. 1677, p. 41.
[4] *Roland.* Hist. *Muratori.* Govern. delle Peste, p. 6.
[5] *T. Short.* Op. cit., vol. i. p. 143.
[6] Annales Cambriæ.

so aggravated by the excessive heat of the summer that fears were entertained it would rival the Athenian plague itself.[1]

In Frissingen there was such a plague of mice, that corn, hay, and all vegetation was eaten up.[2]

A.D. 1251. A most intolerably hot summer. Famine in Italy and epidemic disease in England.

'Thunder and lightning came in the summer of this year, which killed many men and cattle in Ireland.'[3]

A.D. 1252. Great epizoöty of anthrax fever in England. 'The summer was very hot and dry throughout England, and from Easter to autumn no rain fell, neither did dew in any way supply the deficiency, so that the surface of the ground was never even moist, whence it happened that grass scarcely grew at all, and by reason of this a severe famine ensued, and a great mortality among men and cattle.'[4] 'In the same year, for the greatest part of March, and the whole of the months of April and May, a burning sun prevailed, and northerly winds continued. The dryness of the weather continued and the dews ceased, so that apples and other fruits, which were now beginning to ripen, withered and fell from the trees, and there was scarcely any fruit, although the spring blossoms gave great promise. Of what remained an unseasonable morning hoar frost, which philosophers call *uredo*, blighted the young apples, and all kinds of fruit and herbs, so that scarcely a tenth part remained. Nevertheless, through the original abundance, had all the apples arrived at maturity, the trees could not have supported them. When the sun had attained its meridian, it was so intensely hot and intolerable, that the surface of the ground was thoroughly parched, so that all the grass being burnt up, food was denied to cattle and sheep. At night the excessive heat produced flies and other hurtful parasites, by which the life of all animals was rendered wearisome. This is from ocular testimony. . . . .

'In the course of the same year, after the excessive heat of the summer, and at the approach of autumn, a plague-like mortality broke out amongst the cattle in many places in England,

[1] *Ubbon.* Emmii Rer. Fries. Hist. 1516.
[2] Chronic. Magdeburg. [3] Annals of Connaught.
[4] *Thomas Wilkes.* A Chronicle of English Affairs.

but especially in Norfolk, the marshes, and in the southern districts, than could ever be remembered, in which pestilence this remarkable fact was observed: all the dogs and crows which fed on the bodies of the dead cattle immediately became infected, grew intensely swollen, and died on the spot. On this account, nobody dared to eat beef of any kind, for fear of being poisoned by this disease. Another remarkable circumstance noticed amongst the cattle: the cows and full-grown bullocks sucked the teats of the milch cows like calves. There is another fact worthy of mention at this time, namely, that at the period when the pears and apples would be fully ripe, the trees were observed to blossom, as if in the month of April. The excessive mortality amongst the cattle and the unseasonable blossoming, together with the unnatural desire of the young cattle, were evidently caused by the heat and dryness of the weather. And this is also to be wondered at, the grass in the meadows was so rotten, hard and dry, during the months of May, June, and July, that if it were rubbed in one's hands it immediately crumbled into dust. When, therefore, the equinoctial season brought rain in abundance to the dried ground, the earth, on account of the sudden opening of its pores, was prodigal of its richness, wherefore it produced grass in large quantity, but of an inferior and unnatural quality. The famished and hungry cattle seized upon this with such avidity, and became so distended with sudden fatness, that they made useless flesh (or flesh useless as food), and this gave rise to inordinate humours. Finally they went mad, and frisked about in an unusual manner, until, becoming suddenly infected with the disease, they fell dead; and the contagion from them, owing to the virulence of the disease, infected others as well. A similar cause can also be assigned for the trees blossoming out of season.'[1] At the same time a disease

[1] *Matthew of Paris.* Op. cit., pp. 806—820. This year affords us some well-marked examples of that particular disease termed anthrax, anthrax fever, carbuncular erysipelas, or splenic apoplexy, and which in its more malignant forms is now somewhat rare in England, though on the continent and in many parts of the world it prevails very extensively and severely, especially during the summer season. In this country it is commonly known as 'black quarter,' 'quarter ill,' the 'blain' (glossanthrax), &c. It is perhaps the most general disease of animals—attacking quadrupeds, bipeds, fowls, and fishes. It especially attacks all

appeared in horses, in England and France, of a most fatal character, called the 'evil of the tongue,' or *tongue ill*,[1] which was in all probability of an anthracoid nature.

'This year was remarkable in Ireland for a great drought, by which multitudes of cattle perished.'[2]

This anthrax or carbonous disease has been considered by some modern medical authorities quite a recent and an exotic malady in England. How far this is correct the above evidence will testify; indeed, we have every reason to believe, that, from time immemorial, anthrax and anthracoid fever have been present among the lower animals, both domestic and feral, and that it has been communicated from them to the human species, and to other creatures which may have partaken of the flesh of these diseased beasts. The frequent mention of 'blains' and 'black blains' (**blezene, blacan blezene**)—terms still employed to designate a particular form of this class of affections in cattle—as afflicting mankind, in the early Anglo-Saxon manuscripts, and the continually-

the domestic animals, and even those of the deer tribe, appearing sporadically, enzoötically, or epizoötically. It is believed to be highly contagious, passing from one animal to another, even of a different species, but not perhaps from man to man. In the early days of Britain, when the country was badly cultivated and the ground undrained—when there were many extensive marshes, and much land covered with swamps and vegetable matter in a decomposing state, such as now exist in Russia, where malignant pustule and other forms of this malady rage—severe epizoöties must have been frequent. The form of anthrax described by Matthew of Paris would appear to be that now commonly known as black quarter or splenic apoplexy, a disease in cattle often arising in our time from the same causes as those enumerated by the worthy historian.

That form which attacked horses is the one technically termed glossanthrax, and is now, so far as I am aware, unknown in Britain. Indeed, I can find no mention of its occurrence in this animal for some centuries. On the continent, and especially in Russia, the equine species is particularly liable to attacks of anthrax. The symptoms, when the tongue is the special seat of disease, have been noted in France, where the malady is then termed *chancre volant*. Large bladders filled with a reddish-coloured liquid form on that organ; in a short time they burst, and give rise to ulcers which rapidly become a mass of gangrene. The tongue sloughs away in pieces, and death quickly takes place in the midst of convulsions.

Cattle die in from six to twenty-four hours after being attacked. It is curious to find a disease, probably of the same nature, now very prevalent in America amongst deer, and designated 'tongue evil.'

[1] *Dunstaple. Short.* Op. cit., p. 149.

[2] *Smith.* History of Waterford.

recurring remedies prescribed in the Saxon leechdoms,[1] would indicate such to be the case. And when we consider the backward state of agriculture, and the unsanitary conditions in which animals were maintained at this period, we can scarcely wonder that wide-spread outbreaks of this fatal and virulent disorder were by no means rare, or that they should be accompanied or followed by malignant pustule or anthrax fever in man.

The laws enacted during the reign of Henry III., at the commencement of this century, appear to have been judiciously framed, at least in so far as the public health in regard to food was concerned; and they also give us some idea of the principal maladies affecting animals then sold for their flesh. From them we are led to infer that anthrax was not at all rare, and that pork was, as it now is, looked upon with suspicion. Butchers were forbidden to sell contagious flesh, or that had died of the murrain (*carnes-suscientas vel morte morina*); to buy flesh of Jews, and then sell it to Christians; or to sell flesh 'measled' or flesh dead of the 'murrain' (*porcinas supsennuates, ut carnes de morina*).[2]

Mr Rogers' researches into the state of agriculture at this period lead him to the following conclusions with regard to pigs: 'Pigs are occasionally said to be leprous, and were especially liable to measles, that is, to entozoa, and the accounts frequently allude to forced sales of animals, in which the latter disease was present or suspected, though it does not appear that such a circumstance seriously depreciated the market value of the animal.'[3]

A.D. 1253. 'This year throughout was abundant in corn and fruit; so much so, that the price of a measure of corn fell to thirty pence. But . . . the sea overflowing its bounds, by its sudden inundations, overwhelmed men and cattle, and when it happened by night it drowned many the more.'[4]

A.D. 1254. A very severe winter in England. 'Also there

[1] For the remedies and incantations in use to cure this disease in people during the Middle Ages in England, *see* Leechdoms, Wortcunning, and Starcraft of Early England. London, 1864-5-6.

[2] Statutes of the Realm, vol. i.

[3] Hist. Agric., vol. i. p. 337.

[4] *Matthew of Paris.* Op. cit.

chanced the same year a great murrain, and death of sheep and deer, so that of whole flocks and herds scarce the half escaped.'[1] 'On that same day (St Gregory's), too, the severity of the frost gave way, which has lasted uninterruptedly for nearly the whole winter; at least, ever since the night of circumcision, when there was seen the wonderful apparition of the ship in the sky, or a cloud very like a ship. The apparition was believed, at the time, to be a sign of coming tempestuous weather, and was, moreover, followed by such a deadly disease amongst sheep and wild beasts, that the sheep-folds were void of sheep, and the forests of wild beasts; indeed, in large flocks scarcely one half survived.'[2]

A.D. 1257. 'In July were excessive rains and floods, and a great scarcity of horses and cattle in England. All the marshes were like a flooded desert.'[3]

A.D. 1258. 'In this same year, the calm temperature of autumn lasted to the end of January, so that the surface of the water was not frozen in any place during that time. But from about this period, that is to say, from the purification of the blessed Virgin until the end of March, the north wind blew without intermission, a continued frost prevailed, accompanied by snow and such unendurable cold, that it bound up the face of the earth, sorely afflicted the poor, suspended all cultivation, and killed the young of the cattle to such an extent, that it seemed as if a general plague was raging amongst the sheep and lambs.'[4] 'On the eve of St John the Baptist (June 23rd) this year, such a violent tempest of rain fell on the waters of the Severn from Shrewsbury towards Bristol, as had not been seen in our days.'[5]

A.D. 1259. 'In this year was a great hunger, that men and beasts died for default of meat.'[6]

A.D. 1260. A great inundation on the Rhine, fatal to multitudes of people and cattle.[7]

A.D. 1264. A comet was seen from the beginning of August until the middle of October. Its appearance in Germany was

[1] *Holinshed.* Op. cit.
[2] *Matthew of Paris.* Op. cit.
[3] *T. Short.* Op. cit. p. 150.
[4] *Matthew of Paris.* Op. cit.
[5] *Matthew of Westminster.*
[6] *Capgrave,* Chronicles of England.
[7] *T. Short.* Op. cit. p. 151.

followed by a great famine, effusion of blood, and death among animals. The famine was so great that many families emigrated into Poland. The mortality among animals was such that no one dared to eat or buy the flesh of oxen.[1] Sheep and cattle were most affected.[2] A murrain destroyed many horses and cattle in England.[3]

A.D. 1266. Swarms of 'Palmer' worms ate up all fruits, herbs, grass, and vegetation in Scotland, and there were such great floods from the sea, the Tay, and the Forth, that innumerable villages, people, and cattle were lost.[4]

A.D. 1274. The Annals tell us that a deadly disease (*lues ovium*)[5] broke out amongst sheep, which persisted for twenty-five or twenty-eight years, and destroyed nearly all the flocks in England. This epizoöty will be more fully noticed in subsequent years.

A.D. 1275-6. 'Very heavy rains in France for these two years; so much so, that the crops could not be gathered, nor the corn sown. A dreadful famine, followed by a still more dreadful pestilence, ensued, by which a great number of men and cattle were destroyed.'[6] 'Great earthquakes in London, and in the whole world. At the same time the rain fell a bright red, as of blood, in Wales. In this year (1275) was first observed the outbreak of common scab (*scabies*) in sheep.[7] Stow, following Thomas of Walsingham, has the following notice of this event for this year: 'A rich man of France brought into Northumberland a Spanish ewe as big as a calf of two years, which ewe being rotten, infected so the country that it spread over all the realm. This plague of murrain continued twenty-eight years ere it ended, and was the first *rot* that ever was in England.'[8] If this be correct, merinos were then first introduced into Britain.

[1] Chronic. Siles. Vetust. Sommersberg, p. 17. Annal. Wratisl. Sommersberg, p. 173.

[2] Henel. ab Hennefeld. Annal. Siles. Sommersberg.

[3] *T. Short.* Op. cit., p. 152.

[4] Ibid. p. 153.

[5] *Thomæ Walsingham.* Historia Anglicana.

[6] *Hofmanni.* Annal. Bamberg. *Ludewig.* Scrip. rer. Bamberg, p. 176.

[7] *Henry de Knyghton.* The Events of England.

[8] *Stow.* The Annales or Generall Chronicle of England. London, 1614, p. 200.

A.D. 1277. 'In this year scab in sheep reigned throughout the whole of England. It was commonly termed "clausick,"[1] and by it all the sheep in the country were infected. A certain ointment composed of quicksilver and pork fat was found to be a good remedy.'[2]

This epizoöty among sheep deserves most particular notice for the following reasons. Stow plainly mentions it as an imported disease, and terms it *rot*. Other authors term it *scabies*, and one mentions what would no doubt have been a very effective remedy for that affection—lard and mercury. Now, the *rot* of the present day is not contagious or infectious; therefore the Spanish sheep could not have contaminated others. The 'scab' certainly is contagious, but Stow, one would think, would not have designated the malady as *rot* when the other term was commonly used. Therefore I think it is most probable that two contagious diseases were introduced into England in these years:—the one *scabies*, and the other *ovine small-pox*. The most diligent search through the most likely Annals of these and the

[1] This is the first time I find the term *clausick* employed to designate a disease. It is evidently derived from the Celtic word *clawr*, *clefre*, or *clauri*, to claw or scratch, as in the itch; and the Anglo-Saxon word *sioc*, *siec*, to be sick or unwell. The name is a new one, and was evidently looked upon as such by the historian. A portion of this history of the supposed first invasion of 'variola ovina' in Britain was published in the *Veterinarian* for May, 1867, and appeared soon after in the *Annales Vétérinaires* of Brussels, having been translated by Veterinary Surgeon Déle, of Antwerp. This gentleman, in a note, offers the following opinion as to 'clausick.' 'The word *clausick* has a striking resemblance to the German word *klauenseuche*, and the Dutch word *klaauwziekte*, which signifies disease of the claw or hoof. The affection mentioned by Mr Fleming may, then, be a *contagious* disease of the hoof, rather than the scab. There can be no doubt as to the meaning of the English term *siek*, derived from the Anglo-Saxon *sioc*, *siec*, which corresponds to the German word *seuche*, and the Dutch *ziekte*, that is to say, diseased. With regard to the word *claw*, which Mr Fleming says comes from the Celtic *clawr*, *clefre*, *clauri*, and which he translates as *to scratch*, its analogy with the German word *klau*, and the Dutch word *klaauw* (nail, hoof, claw, talon) is perfect. There is as much reason to suppose that the word *clausick* was applied to a disease of the hoof as to one in which the foot was used to scratch the itching skin.' I think M. Déle is not quite correct in supposing that this can be a hoof disease instead of scab. The meaning of the word, as applied in this instance, is undoubtedly to tear with the nails or claws: to tear or scratch in general. I am not aware that any contagious foot disease was known in sheep at this early period. Besides, here we have distinct evidence of the nature of the malady in the success of the remedy—mercury and lard.

[2] Waverly Annals, vol. ii. p. 233.

preceding years lead me to the conclusion that this is correct, and that the first trace we obtain in history of this serious malady —sheep small-pox—appearing as an epizoöty, is in Britain. This is rather singular, considering that the malady is believed to be exotic, and that in those countries from whence we usually derive it, there were at that time numerous chroniclers, who would, we might suppose, have mentioned the outbreaks of this formidable contagion. Such is not the case, however; and to English historians we are indebted for sufficient evidence to establish a reasonable supposition that ovine variola was, in a masked form, imported into Britain by a Spanish ewe. In 1847 the disease was imported by Spanish or merino sheep, and caused severe loss.

But that this disease of sheep existed and was well-known in Britain more than two hundred years before 1275, cannot be a matter for doubt; and that its cure had engaged the attention of the leeches of these days is also a certain fact. In a curious Saxon manuscript of the Harleian collection (No. 585), supposed to be written in the tenth or eleventh century, and inscribed 'Lacnunga' is the following recipe: 'For *pocks* and skin eruptions (ꝑiꝺ poccum y ꝛceapa hꞑeoꝑlan): lupin and ever-fern, the nether part of it, the upper part of spearwort, ground, great or *horse* beans, pound all together very small in honey, and in holy water, and mingle all well together, put one dose into the animal's mouth with a spoon, three doses a-day always; for nine times if mickle need be.'[1] This is certainly the earliest notice I can find of this malady; but whether it was very prevalent, or whether its contagious nature was understood by the Saxon doctors, is quite a mystery. Beyond the recipe and the mention of the disease, all is darkness. At this somewhat early period, however, the symptoms of disease are but rarely entered in the Leech-books; and for many centuries after this time, the medical philosophers in Britain were content to limit their skill to the principles of cure by means of uncouth and fantastic recipes.

The *clauri* or scabies of the Welsh sheep has been already

[1] *Rev. Oswald Cockayne.* Leechdoms, Wortcunning, and Starcraft of Early England. London, 1865. Vol. iii. p. 57.

mentioned in our notice of the Laws of Howel, revised more than two hundred years before this period; and the *scab* and tetter (rceb, teten) were well-known diseases among the Saxon shepherds.[1]

The term *rot* appears subsequently to have been applied to small-pox, or some other malady which was contagious, and to have continued in use for some time.[2] For instance, Dryden, four centuries after this invasion, says:—

> 'Your teeming ewes shall no strange meadows try,
> Nor fear a *rot* from *tainted* company.'

In the fourteenth century, the century following these descriptions, we have direct testimony that the small-pox of sheep was known to poets, and that in England. Delightful old Chaucer is the very first *non-scientific* writer who, in this way, gives us the plainest proof of its existence when he wrote his famous Canterbury Tales, about the middle of that century. In the Pardoner's Story, when that knavish ecclesiastic is describing his mummeries and conceits, he is made to say:—

> 'Then show I forth my longe crystal stones,
> Ycrammèd full of cloutès and of bones,
> Relics they be, as weenen they each one,[3]
> Then have I in laton[4] a shoulder-bone,
> Which that was of a holy Jewès sheep.
> Good men, say I, take of my wordès keep,
> If that this bone be wash'd in any well,
> If cow, or calf, or sheep, or oxè swell,
> That any worm hath eat, or worm ystung,[5]
> Take water of that well, and wash his tongue,
> And it is whole anon; and, furthermore,
> *Of pockès,*[6] *and of scab, and every sore,*

[1] *Rev. Oswald Cockayne.* Leechdoms, Wortcunning, and Starcraft of Early England. London, 1865. Vol. i. p. 24.

[2] In Loudon's *Encyclopædia of Agriculture*, published so late as 1839, it is noted that the *rot* is a popular term among shepherds, and includes within its range diseases widely different. This writer speaks of *blood rot*, *glanderous rot*, the *great rot*, *hydropic rot*, *pelt rot*, and *hunger rot*.

[3] As each one weens or believes.

[4] A cross made of a mixture of metals resembling brass. [5] Stung.

[6] The Saxon *pocke*, old Anglo-Saxon 'pocca.' The Germans still usually term this disease 'Schafpocke,' and pock is not an unfrequent word among ourselves to designate the variolous eruption.

Shall every sheep be whole, that of this well
Drinketh a draught: take keep of that I tell.'

It is not until nearly four centuries after the Saxon leech-book had been written, and a century after Chaucer, in undeniable English, explicitly designates the malady by the name now familiar to us (though in mentioning *scab* the poet says nothing of *rot*, an indigenous malady), that the earliest notice of it is to be found on the continent.

In the *Avocat Pathelin* (the Crafty Lawyer), a farce which appears to have been published in France in 1460, though it may have been played before that time, we learn that the disease was sometimes prevalent amongst the flocks, and was known as *clavelée* (from *clavus*, a nail; probably owing to the way in which the scabs or pustules studded the skin like nail-heads), the popular name for it in France at the present day. One of the actors, Agnelet (lambkin), blames it for causing a considerable mortality.[1] The first notice we have of it by a medical writer is in 1578.

Some writers have believed the disease known as *pusula* (another form of expression for *pustula*, a blister, pimple, or pustule) by the Romans, and mentioned by Marcus Columella to be ovine small-pox; but there is little proof that such was the case. On the contrary, we have it distinctly stated that it was the *ignis sacer*. '*Est etiam insanabilis* ignis sacer, *quem pusulam vocant pastores*.'[2] We will examine this part of the subject hereafter. At present our researches into the history of small-pox in sheep effectually demolishes the absurd notion of a great French na-

[1] *Laharpe.* Cours de Litterat., part ii. chap. vii. *Luard.* Mélange de Litterat. Hist. du Theâtre Française, vol. iv. p. 36.

[2] There is some difficulty here in the stereotyped phrase *ignis sacer.* The ancients applied the words to many skin affections, we have reason to believe; and with the exception of the extreme contagiousness of that malady, its chiefly affecting the surface of the body, and its being designated a *pustular* disease by the Roman shepherds, we have no proof as to its identity with small-pox. The *ignis sacer* has usually been supposed to be gangrenous erysipelas, which is sometimes epizoötic amongst the flocks of southern countries (*Gelle.* Pathologie Bovine), and is thought by some to be only a form of anthrax. (See *Gasparin.* Maladies des Bêtes à Laine. *Reynal.* Dictionnaire de Méd. &c., Vétérinaires, vol. vi. Art. 'Erysipèle.') At a certain stage of the malady vesicles or bullæ are formed, which may have misled the shepherds, who would think them pustules.

turalist,[1] that the variolous disease owed its origin to the turkey (*Meleagris gallopavo*), a bird only imported into Europe by the Spaniards in 1530, nearly five hundred years after it is mentioned as a known disease, and two hundred after Chaucer distinctly alludes to it; as well as three hundred after a probable outbreak in England, due to the importation of a diseased Spanish sheep, and which lasted for twenty-eight years. Besides, the disease (like cow-pox?[2]) has never, to my knowledge, been seen in Mexico, the native country of the turkey.

Much mystery attends the early history of human variola in Europe. We have already seen that in A.D. 569 the word *variola* was employed to designate an epidemic in Italy and France; the malady certainly appears to have been sufficiently specified towards the end of the sixth century under the designations of *lues cum vesicis pusulæ* or *pustulæ*, and *morbus dysentericus cum pustulis*, as well as *coralis*. Gregory of Tours says: *Rusticiores vero* corales *has pustulas nominabant;* and in A.D. 772 the pox (small-pox) is reported to have raged over the whole of Ireland. Rhazes, or Razi, an Arab physician, accurately described the disease in a special monograph, about the year 900; and Dr Short, an excellent medical historian, appears to believe that the malady was one of ancient date in Europe, but had not attracted much attention because of the mild form it exhibited. 'The small-pox seem not to have been so severe and fatal formerly as in late ages, since the ancients do not treat of them particularly; but are thought to intend them under such general names as some think sufficient to express their nature, as *papulas, filius ignis, carbones ad ustos, pustulas latas sublimes nigras, ulcerosas caput cutemque puerorum occupare; exanthemata eithymata multa et varia exercere*, &c. The Arabians first treated of them professedly, and they always joined them to the plague and pestilential fevers; but neither Greeks, Latins, nor Arabians tell us when they first begun: probably because they were long before their days, but not being so fatal as

[1] *Buffon.* Hist. Nat. du Dindon.

[2] For evidence with regard to the probable existence of cow-pox among the cattle of South America from the earliest times, see *Humboldt*, Essai Politique sur la Royaume de la Nouvelle-Espagne, vol. i. p. 67.

now, they challenged no such particular regard. . . . . I do not take the small-pox in general to depend on either season or temperature of the air; for in different places, in the same climate and constitution, I find them a perpetual epidemic, scarce ever out in all places of Britain at once; and besides (as Dr Lister and Dr Hillary well observe), they are originally an exotic disease, unknown to Europe, Asia Minor, or Africa, before the spice trade was opened to the remotest part of the East Indies, when they were first brought into Africa, thence into Europe. The first time we meet with them in English history is in 907.'[1]

In a Saxon 'Læce Boc,' or Leech Book, of the first half of the tenth century, we find several recipes for the cure of the small-pox, which is there termed 'poc addle' (poc adle), or pock ailment. The recipes consist of internal remedies, chiefly decoctions of herbs, and salves (Sealf). One of the recipes says: 'Against pocks (Þiþpoccum), a man shall freely employ bloodletting and drink melted butter, a bowl full of it: if they break out one must delve or dig away each one of them with a thorn; and then let him drip wine or alder drink within them, then they will not be seen, or no traces will remain.' And to show that the disease was greatly dreaded, we have a prayer against it. In a Cottonian MS. there is a charm against small-pox. The MSS. containing these recipes, prayers, and charms, were, in all probability, written at periods but little removed from the date when Rhazes composed his monograph on this serious malady.

Burton[2] says that the 'Judari,' or small-pox, appears to be indigenous to the countries bordering upon the Red Sea. He observes that we read of it there in the earliest works of the Arabs; and even to the present day it sometimes sweeps through Arabia and the Somali country with desolating violence. Conjecture, however, goes a long way beyond reason when it discovers small-pox in the Tayr Ababil, the 'swallow-birds,' which, according to the Koran, destroyed the Abyssinian host of Abrahat el Ashrand in 569 or 572.[3] There is some difficulty about

[1] *T. Short.* Op. cit., vol. ii. pp. 361, 415.
[2] *Burton.* Pilgrimage to El Medinah and Meccah, vol. i. p. 367.
[3] *Hecker.* Geschichte der Medicin, vol. ii. p. 152.

the word *ababil,* Major Price having translated it as the plural of *abilah,* a vesicle; but Burton thinks the former is an Arabic and the latter a Persian word, and that they have no connection whatever. M. C. de Perceval, quoting the 'Sirat el Rasul,' which says that at that time small-pox first appeared in Arabia, ascribes the destruction of the host of Yemen to an epidemic and a violent tempest. The strangest part of the story is, that although it occurred at Meccah, about two months before Mahomet's birth, and therefore within the memory of many living at the time, the prophet alludes to it in the Koran as a miracle. The same intrepid traveller, Burton, in another work on Africa, remarks: 'The most dangerous disease is small-pox, which history traces to Eastern Abyssinia, where it still becomes at times a violent epidemic, sweeping off its thousands.'[1] And elsewhere, in speaking of the diseases of East Africa, he seems to think the small-pox a native of that country. 'The most dangerous epidemic is its *aborigen,* the small-pox, which propagated without contact or fomites, sweeps at times like a storm of death over the land.'[2]

Niebuhr[3] informs us that a rude form of inoculation—the mother pricking the child's arm with a thorn—has been known in Yemen from time immemorial. Forbes thought small-pox in man had been known in Ceylon since the 3rd century. When mentioning vaccination in that island, he expresses a hope that it will 'prevent any very extensive ravages from a cause which has formerly contributed materially to the depopulation of the island, and is probably the Red-eyed Demon of pestilence who is recorded to have swept the country of half its numbers in the 3rd century, and in the reign of Sirisangabo.'[4] It may at this primitive period have been introduced from Africa.

With regard to variola ovina, it is curious to find that its supposed earliest invasion of this country as an epizoöty, and its presence here and elsewhere since the 13th century, should be in connection with the importation or introduction of Merino

[1] First Footsteps in East Africa, p. 180.
[2] The Lake Regions of Central Africa, vol. ii. p. 318.
[3] Beschriebung von Arabien, 1772.
[4] Eleven Years in Ceylon, vol. i. p. 357.

sheep. It is asserted that the sheep of the South Atlas, Africa, are the progenitors of the Spanish Merino;[1] and, according to Erman,[2] the original Spanish sheep were black, with a coarse and very inferior wool, till the Roman colonists settled there and introduced a taste for rural pursuits. Marcus Columella (A.D. 40) was the first to notice the wild mouflons at Cadiz, which were on their way from Africa to the Arena at Rome, and which race he afterwards used for the improvement of the Spanish breed. Did these African sheep introduce the disease into Europe at this period, when they were exported from a region where the small-pox of man appears to have had its earliest home? It will be seen hereafter that this breed introduced into France and Germany a malady unknown amongst them in Spain, and never seen or heard of until they were imported into those countries —the contagious foot disease. Columella was the first to breed the wild mouflon with the Spanish sheep; he was also the first to describe an extremely contagious and fatal disease amongst sheep, which he designated *ignis sacer*, but which the shepherds called *pusula*. Was this the variolous disease of the ovine species? It would scarcely be safe to pronounce in a positive manner; and unfortunately the paucity of writers between the 1st and 9th or 10th centuries, when the malady is for the first time properly named, is a great bar to further investigation in this direction.

For the year 1280, there is mention made of perhaps this same sheep mortality, which may have extended to Wales. 'There was a great murrain among sheep (*magnum morina ovium*), which began in the preceding year.'[3]

A distinguished professor,[4] in discussing the agricultural history for this epoch, writes: 'Among the diseases peculiar to sheep, the scab is very frequently mentioned. This disease made its appearance at or about the year 1288 (?), and became endemic. It was at first treated with copperas and verdigris; but in time, that is, at about the close of the 13th century, it was

[1] *Tristram.* The Great Sahara, p. 56.
[2] Travels in Siberia, vol. ii. p. 161.
[3] Annales Cambriæ.
[4] *J. Rogers.* Hist. of Agriculture in the 13th and 14th centuries, vol. i.

discovered that tar (generally called bitumen in the accounts of the farm bailiffs, but occasionally by its English name) was a specific for the complaint. Shortly after this time the purchase of tar is a regular entry. It is clear that the remedy was mixed with butter or lard, and then rubbed in. Note is occasionally taken of any exceptional prevalence of this disease, which seems never to have been eradicated, but only to have varied in intensity and frequency. 'And for this year (1288), in the farm accounts of Stanham, he finds the following entry: Nimia infirmitas et *Scabies* bidentium: fleeces small.'

'Sheep, again,' observes Mr Rogers,[1] in referring to this period, 'were liable to several diseases, and among these the *rot* and the *scab*. The former affecting the general health of the animal, the latter its most valuable produce, were the cause of continual anxiety to the medieval farmer as they are to his descendant.'

'There are,' says Walter de Henley, 'several means by which shepherds profess to discover the existence of rot. 1. They look at the veins under the eyelid. If these are red, the sheep is sound; if white, unsound. 2. They try the wool on the ribs. If it holds firmly to the skin, it is a good sign; if it pulls off easily, it is a bad one. 3. If the skin, on rubbing, reddens, the sheep is sound; if it remains pale, the animal is rotten. 4. About All Saints' day, November 1, if the hoar-frost in the morning is found to cling to the wool, it is a good sign; but if it be melted, it is a sign that the animal is suffering from an unnatural heat, and that it is probably unsound. If one of your sheep dies, put the flesh at once into water, and keep it there from daybreak to three o'clock (*nones*), then hang it up to drain thoroughly, salt it and dry it. It will do for your labourers.'[2]

The venerable and learned Fleta,[3] who also writes at this period, gives us an excellent description of the duties of the shepherd, the care to be taken of the sheep, and the maladies to which they were then liable. The great rarity of this work, and the value of its author's remarks in the chapter entitled 'De toribus,' almost induce me to offer a translation, but space forbids.

[1] *Rogers.* Op. cit., vol. i. p. 334. [2] Ibid.
[3] *Fleta.* Commentarius Juris Anglicani, lib. ii. cap. 79.

A.D. 1279. 'In this year, in every young horse that was foaled, there appeared four permanent teeth.'[1]

A.D. 1283. Mr Rogers informs us that in the accounts for farm stock for Ditchingham, under this date, there is the entry, 'Morbus generalis.'[2] When King Philip of France was invading Spain with 200,000 infantry and 86,000 cavalry, and while at Gerona, the whole force suffered severely from disease, losing 4000 men, and nearly as many horses. Tremendous swarms of flies (*moscas*) as large as acorns, and of a different shape from the ordinary flies, appeared, and attacked both men and horses. No sooner were these stung by them than they died. So great was the sickness that this monarch was unable to show himself before Cataluña. This dreadful plague, says the chronicler, was attributed to a miracle wrought by St Narcissus.[3]

A.D. 1286. A strange kind of *worm* infested Prussia. It had a tail like a crab, and whatever animal was stung by it was dead within three days.[4] 'Throughout Austria and some other countries the following unheard-of occurrence took place: the fowls and small birds that were previously perfectly healthy suddenly dropped down dead, and the heavens were so robbed of their small birds that scarcely a magpie, or a crow, or any other bird, was to be seen.'[5]

A.D. 1291. An epizoöty in Iceland among horses. 'The great icebergs melted, and winter went away; then came a disease among cattle (*felli vetr*).'[6]

A.D. 1299. An epizoöty among horses at Seville. According to the veterinarians Martin Arrendondo and Fernando Calvo, who derived their information from Laurentius Rusius, it manifested itself with great severity, and killed more than one thousand horses. Rusius says of it: 'There was a certain fever broke out among horses which seemed to be incurable.

[1] Chronic. Claustro-Neoburgens. [2] *Rogers.* Op. cit., vol. ii.

[3] *Villalba.* Op. cit., vol. i. p. 63. These flies may have been the *Simulum reptans*, a native of eastern countries and of Hungary; or even the African fly, *Chrysops coecutiens*, which is said to attack horses and to blind them. They might have been carried over by high winds to Spain.

[4] Chronic. Magdeburg. [5] Chronic. Claustro-Neoburgens.

[6] Annals Isl. *Langebek*, vol. iii. p. 119.

The horse carried its head drooping, would eat nothing, tears ran from the eyes, and there was hurried beating of the flanks. The malady was epidemical, and in that year more than one thousand horses died.'[1] For Germany there is noted the following: 'In this year a deadly disease broke out among cattle, which destroyed many throughout the world.'[2]

'At Genelow Castle, in Burgundy, was a great fight or battle of dogs, wherein of 3000 all were killed but one.'[3]

What may have been merely the result of epizoötic diseases amongst some of the lower animals, old authors, in all probability, ascribed to battles between them. It must not be forgotten, however, that sometimes affrays of this kind do happen, though very rarely, and that damage is not unfrequent. Amongst dogs, for example, rival factions now and again meet and decide their differences by combat, like Christians, as Burton and Hooker testify.[4]

A.D. 1302. 'A great loss of cows (*bo-dhith*), and a slaughter (*ar*) upon all the beasts of Ireland this year.'[5]

A.D. 1308. In Ireland, 'in the Easter, in the month of March in this year, there was a destruction of men and cattle in it, and great inclemency of weather too.'[6] 'There was a great murrain of cattle.'[7]

A.D. 1310. In Germany, destruction of plants and inundations. 'This year was a very unfortunate year in consequence of the large quantity of vermin and caterpillars and mice, which ate up everything before them. Then, because of the great inundations, which began on the 13th of July, were greater 1st of August, and greatest on the 2nd of August, much damage was done.'[8]

'There was so great a famine and scarcity of victuals in the kingdom of Scotland, Anno Domini 1310, that in many

[1] *Laurentius Rusius.* Hippatria or Marescalia, vol. i. chap. clvi. p. 135. Heusinger says the epizoöty occurred at Rome. It may have been, and probably was, what is now popularly termed 'influenza.'

[2] Chronic. Ensdorf. Œfele, vol. i. p. 585.

[3] *T. Short.* Op. cit., p. 159.

[4] Pilgrimage to El Medinah and Meccah, vol. i. p. 289. Tour in Iceland.

[5] Annals of Connaught.

[6] Ibid.

[7] Annals of Clonmacnoise.

[8] *Henncbergsche.* Chronik., i. p. 329.

districts multitudes were compelled through hunger to eat the flesh of horses and of other unclean animals.'[1]

A.D. 1313. An epizoöty among the horses at Rome. Rusius says of it: 'An epizoöty of horses at Rome. Some called the disease a fever, and some esquinancy (*angina*). I myself lost more than fifty horses in my time.'[2] There was also an epizoötic disease amongst horses (*hrosfellis vetr*) in Iceland.[3]

A.D. 1314. Famine in England. 'The morrow after Candlemas day there assembled a parliament at London to treat of the state of the kingdom, and how to bring down the prices of victuals, that were now grown to be so dear that the common people were not able to live. . . . Notwithstanding the statutes of the last parliament, the King's writs, &c., all things were sold dearer than before. No flesh could be had, capons and geese would not be found, eggs were hard to come by, *sheep died of the rot,* swine were out of the way; a quartern of wheat, beans, pease were sold for twenty shillings, a quartern of malt for a mark, a quarter of salt for thirty-five shillings, &c. . . . The king in a parliament at London revoked the provisions before made for selling of victuals, and permitted all men to make the best of what they had. Nevertheless, the dearth increased through the abundance of rain that fell in the harvest, so that a quarter of wheat or malt was sold before midsummer for thirty shillings, and after for forty shillings. There followed this famine a grievous mortality of people, so that the quick had enough to do to bury the dead. . . . . The beasts and cattle also, by the corrupt grass whereof they fed, died, whereby it came to pass that the eating of flesh was suspected of all men, for flesh of beasts not corrupted was hard to find. Horse-flesh was counted great delicates, the poor stole fat dogs to eat, some (it was said) compelled through famine, in hidden places, did eat the flesh of their own children, and some stole others which they devoured. Those who were in prisons did pluck in pieces those that were newly brought amongst them, and greedily devoured them half alive.'[4]

[1] *Johannis de Fordun.* Scotichronicon, p. 1005.
[2] *Laurent. Rusius.* Op. cit.
[3] Annals Island. *Langebek,* vol. iii. p. 129.
[4] *Stow.* Annals, p. 217, 218.

A.D. 1315. 'Also in the ninth year of King Edward's reign, before Christmas, a blazing star or comet appeared in the north part of the element by the space of a month together, and after followed dearth and death. . . . . The dearth, by reason of the unseasonable weather in the summer and harvest last past, still increased, so that which with much ado was issued (carried), after, when it came to the proofs, yielded nothing to the value of that which in sheaf it seemed to contain, so that wheat and other grain which was at a sore price before, now was enhanced to a far higher rate, the scarcity thereof being so great, that a quarter of wheat was sold for forty shillings, which was a great price, if we consider the value of money then current. Also by reason of the *murrain* that fell among cattle, beeves and muttons were unreasonably priced.'[1]

A.D. 1316. For this year Duchesne makes mention of a general epizoöty and epidemy which prevailed in England. It was supposed to be due to extreme humidity of the air occasioned by long-continued rains after a severe winter, and inundations. The grain was rotted, and fruit and all kinds of forage and grain were destroyed. The consequence was a most intractable and deadly form of dysentery, which carried off large numbers of men and animals.[2] 'Wheat, though poor stuff, was sold at forty and forty-four shillings per quarter; and by reason of the murrain among cattle, beef and mutton were exceeding dear; after this, both famine and mortality increased much, together with a general failure of all fruits of the earth, by excessive rains and unseasonable weather.'[3] Rogers discovers in the records of Ponteland, that the bailiff is allowed for six oxen which had died of the disease 'current' in the country. A similar state of affairs was noted in Saxony.[4]

In many countries the extraordinary state of the weather gave rise to famine and disease.[5]

A.D. 1317. 'In this season victuals were so scant and dear, and wheat and other grain brought so high a price, that the

[1] *Holinshed.* Op. cit.
[2] *A. Duchesne.* Histoire Gén. d'Angleterre, p. 728.
[3] *T. Short.* Op. cit., p. 161. [4] Hist. Agric., vol. ii.
[5] See *Frari*, and also *Schnurrer.*

people were constrained through famine to eat the flesh of horses, dogs, and other vile beasts, which is wonderful to believe, and yet for default there died a great multitude of people in divers places of the land. Fourpence in bread of the coarsest sort would not suffice a man a day. Wheat was sold in London for four marks the quarter, and even more. Then after this dearth and scarcity of victuals ensued a great death and mortality of people.'[1] 'In that same year was great murrain of beasts, which began in Essex, and after it spread through the land. It reigned most in oxen, and when the beasts were dead dogs would not eat of the flesh.'[2]

A.D. 1318. 'A great murrain of kine happened, which were so mortally infected, that dogs and ravens eating of the carrion of the kine, were poisoned, and did swell to death, so that no man durst eat any beef.'[3] Mr Rogers reports that in this year, at Southampton, there was 'murrain among oxen. Hay scarce.'[4]

A.D. 1319. 'In this season, to wit, 1319, a great murrain and death of cattle chanced through the whole of the realm, spreading from place to place, but especially this year it raged most in the north, whereas in the years before it began in the south parts.'[5] The carrion still poisonous.[6] 'In the same year there was an unheard-of pestilence among animals in England, but from what cause is doubtful. It began in Essex about Easter, and spread itself in a short time through the whole island, lasting throughout the whole year, and contaminating almost all the cattle of the realm. It is rumoured, what is most unusual, and what will be perhaps incredible to future ages, that dogs died from eating the dead bodies of the cattle, and crows were swollen immediately after feeding on them, and were as though intoxicated with poison, and fell down dead, on account of which circumstance, no man dared to eat the flesh of oxen, because this pest prevailed chiefly in oxen. It was said that the whole of Gaul was infected with

[1] *Holinshed.* Op. cit.
[2] *Capgrave.* Chronicles of England.
[3] *Stow.* Op. cit., p. 219.
[4] *Rogers.* Op. cit., vol. ii.
[5] *Holinshed.* Op. cit.
[6] *T. Short.* Op. cit., p. 163.

this disease about the same time.'[1] This was, without doubt, another severe and wide-spread outbreak of anthrax.

A.D. 1320. At Southampton, according to Mr Rogers' researches, 'Ffarsine (farcy) was prevalent among horses in the summer.'[2]

A.D. 1321. An exceeding hot and dry summer in England; springs and rivers failed, beasts and cattle suffered extremely; many died for want of drink.[3]

A.D. 1321, 1322. 'A great destruction of cows throughout all Ireland, the like of which was never known.'[4]

A.D. 1324. 'The murrain of cows continued still in Ireland, and was called the "moyle dawine."'[5] 'The same destruction of cows throughout all Ireland this year, and it was it that was called the "maeldamhnaigh."'[6] 'There was a general plague of cows and also other animals, which was called in Ireland "maldow."'[7] This was probably the same epizoöty that prevailed in England in 1319.

A.D. 1325. A great drought in England. 'Here, in the summer of this and the following year, there was so great a drought that it may truly be said concerning this land what Theodolus has applied to it:—

> Anglorum terras jam fervida torruit æstas,
> In cancro solis dum volvitur aureus axis.

'In consequence of the drought, the great rivers were dried up, the springs failed, and in many places water had entirely disappeared. In consequence of this misfortune, great multitudes of animals, wild as well as domestic, perished of thirst.'[8]

Influenza, for the first time in the annals of that country, is mentioned as occurring in Ireland. 'An epidemical disease (*teidhm galair*) common throughout all Erinn, and which was called "slaedan" (prostration-influenza), which affected, during three or four days, every person, so that it was second only to death.'[9]

[1] *Thomas Walsingham.* Historia Anglicana.
[2] Hist. Agricult.
[3] *T. Short.* Op. cit., p. 163.
[4] Annals of Connaught.
[5] Ibid.
[6] Ibid.
[7] Annals of Ross.
[8] *Thomas Walsingham.* Op. cit.
[9] Annals of Ulster.

A.D. 1328. In an Arab treatise on veterinary science, written by a wealthy chief of Yemen in 909 of the Hegira, and entitled 'Kitâb el-akouâl,' there is an account of a disastrous epizoöty among the famed horses of Yemen in this year. The translation of M. Perron[1] runs as follows:—

'The epizoöty that attacked the horses of Yemen in the year of the Hegira 728, was of the worst character and was rapidly mortal. No one knew how to recognize or characterize it, and in no book or hippiatric treatise of past ages could any distinctive traces of it be found mentioned. No efficacious remedy could be derived to cure it. The animal attacked was not allowed time to benefit by medical or any other kind of treatment. This malady had not, like other diseases, any premonitory symptoms. It suddenly struck the animal, which perhaps would be eating, and all at once something escaped from the nostrils like mucus; for a moment the horse's head was drooping on the ground, from which he had no longer strength to raise it, and then he fell dead. Sometimes he struggled for a few seconds before he expired. The malady first began in the kingdom of Hadramaût, then it was propagated into Yemen, and as far as Mecca. An incalculable number of horses perished.

'Mules also died in great numbers, but not so extensively as the horses. The best and purest bred horses furnished the largest number of victims to the scourge. At the great fair of Aden they died in crowds. So quickly did the animals succumb, that while two individuals were discussing the price of a horse, the disease attacked it, and it died before they had time to conclude the bargain. Horse-dealers from India also bought horses there at very high prices, but these carried the malady with them and suddenly perished. It was observed, as a consequence of these frequent repetitions, that the Indian dealers carefully everted the upper eyelid of any horse they were about to buy; and any animal that showed a yellow tint in this part they abstained from purchasing. Indeed, when this tinge was present, it was not long before the horse succumbed to the malady.' This may have been an epizoöty of the protean malady 'influenza' or typhus

[1] Le Nâceri. Paris, 1860. Vol. iii. p. 275.

A.D. 1333. 'The losses of stock sustained by the medieval farmer,' says Mr Rogers,[1] 'were enormous. As has been said, all deaths were grouped under the general name "murrain." But at Maldon, the farmer, in 1333, reports the loss of more than half his sheep and lambs; at Letherhead the loss is little short of the same rate; at Farley it is more than twenty-five per cent; at Woolford and Basingstoke it is about thirty-four per cent; at Wolford a little less than fourteen; and at Cuxham about eleven.'

A.D. 1334. Inundations in England. 'This year were so great waters, that they broke down walls in Temse (Thames?), and other places overcovered the lands, and killed many beasts.'[2]

A.D. 1335. In England, 'after abundance of rain of this year, came a murrain of cattle and dearth of corn. Wheat at forty shillings a quarter.'[3] 'So great a death in England that scarce could the living bury the dead.'[4]

In Ireland, 'there was such a great snow in the spring of this year, that the most part of the small fowle of Erinn died.'[5] 'A great snow in the spring of this year, by which was destroyed almost all the small birds of Ireland.'[6] Great swarms of locusts in Italy.[7]

A.D. 1336. A mortality among animals in Iceland. 'Then in spring came a storm of water so great, that all kinds of cattle were destroyed.'[8]

In Ireland, 'a great plague of snow and of frost in this year, from the first fortnight of winter until a part of the spring had commenced. A great portion of the cattle of Erinn were lost in it; and the grass and corn-fields of Ireland were destroyed the same year.'[9]

A.D. 1338. Heavy rain in Germany. In the previous year locusts appeared in crowds in every part of Europe. In this year in Germany there appears to have been a scarcity of salt. 'Worms were bred in human bodies, so that many people died. Out of the mouths of these the worms crept—a sight dreadful to

[1] Hist. Agricult., vol. i. p. 53.
[2] *Capgrave.* Op. cit.
[3] *Henry de Knyghton.* Op. cit. [4] *How.* [5] Annals of Clonmacnoise.
[6] Annals of Connaught. [7] *Corio.* Storia di Milano.
[8] Annal. Island. *Langebek.* Scrip. rer. Dan., iii. 134. [9] Annals of Ulster.

look at. The frequent rains in the marshy places caused immense mortality to man and beast, through the dykes having been broken down.'[1]

In Ireland, 'intense frost, with very deep snow, from the 2nd of December to the 10th of February.'[2] 'This year was very tempestuous, and noxious to man and beast . . . . and in this year oxen and cowes died, and sheep, particularly, were almost destroyed, so that, according to the common complaint, scarcely the seventh part escaped from the pestilence; but the loss of lambs was greater.'[3] This is the first recorded ovine epizoöty in Ireland.

A.D. 1339. 'A great plague (*plaigh*) from frost and from snow upon the cattle and the grass and corn-fields of Ireland, from a fortnight of winter to a part of the spring.'[4] In this and the following year locusts were in Europe.

A.D. 1345. In the bailiff's accounts for Walford, there is the following entry: 'Tantum (of tar and grease); propter caristiam et nimiam scabiem.'[5] Plague in mankind in Illyria and Italy during this and successive years.[6]

A.D. 1347-9. Before this period, there had been terrible cosmical perturbations, which caused great physical changes in China and other countries, and destroyed immense multitudes of human beings. 'From China to the Atlantic, the foundations of the earth were shaken. Throughout Asia and Europe the atmosphere was in commotion, and endangered, by its baneful influence, both vegetable and animal life. The series of these great events began in the year 1333, fifteen years before the plague (the "Black Death," *Sorte Diod*, or *Schwarze Tod*) broke out in Europe; they first appeared in China. Here a parching drought, accompanied by famine, commenced in the tract of country watered by the rivers Kiang and Hoanghô. This was followed by such violent torrents of rain, in and about Kiangsi, at that time the capital of the Empire, that, according to tradition, more than 400,000 people perished in the floods. Finally the

[1] *Hamsfortii.* Chronologia. *Langebek.* Vol. i. p. 303.
[2] *Grace.* Annals.
[3] *Clyn.* Annals.
[4] Annals of Connaught.
[5] Hist. Agricult., vol. ii.
[6] *Frari.* Op. cit. p. 295.

mountain Tsinchow fell in, and vast clefts were formed in the earth. On the succeeding year (1334), passing over fabulous traditions, the neighbourhood of Canton was visited by inundations; whilst in Tche, after an unexampled drought, a plague arose, which is said to have carried off 5,000,000 people. A few months afterwards an earthquake followed, at and near Kiangsi; and subsequent to the falling in of the mountains of Ki-ming-shan, a lake was formed of more than a hundred leagues in circumference, where, again, thousands found their grave. In How-kwang and Honan a drought prevailed for five months, and innumerable swarms of locusts destroyed the vegetation; while famine and pestilence, as usual, followed in their train. Connected accounts of the condition of Europe are not to be expected from the writers of the fourteenth century. It is remarkable, however, that simultaneously with a drought and renewed floods in China, in 1336, many uncommon atmospheric phenomena, and in the winter frequent thunder-storms, were observed in the north of France; and so early as the eventful year of 1333 an eruption of Etna took place. According to the Chinese Annals, about 4,000,000 people perished by famine in the neighbourhood of Kiang in 1337; and deluges, swarms of locusts, and an earthquake which lasted six days, caused incredible devastation. In the same year the first swarms of locusts appeared in Franconia, which were succeeded in the following year by myriads of these insects. In 1338, Kiangsi was visited by an earthquake of ten days' duration; at the same time France suffered from a failure in the harvest; and thenceforth, till the year 1342, there was in China a constant succession of inundations, earthquakes, and famines. In the same year great floods occurred in the vicinity of the Rhine and in France, which could not be attributed to rain alone; for everywhere, even on the tops of mountains, springs were seen to burst forth, and dry tracts were laid under water in an inexplicable manner. In the following year the mountain Hong-tchang, in China, fell in, and caused a destructive deluge; and in Pien-chow and Leang-chow, after three months' rain, there followed unheard-of inundations, which destroyed seven cities. In Egypt and Syria violent earthquakes took place; and in China they became, from

this time, more and more frequent; for they recurred in 1344, in Ven-chow, where the sea overflowed in consequence; in 1345, in Ki-chow, and in both the following years in Canton, with subterraneous thunder. Meanwhile floods and famines devastated various districts, until 1347, when the fury of the elements subsided in China.[1]

The signs of terrestrial commotions commenced in Europe in the year 1348, after the intervening districts of country in Asia had probably been visited in the same manner.

On the island of Cyprus, the plague from the East had already broken out; when an earthquake shook the foundations of the island, and was accompanied by so frightful a hurricane, that the inhabitants who had slain their Mahometan slaves, in order that they might not themselves be subjugated by them, fled in dismay, in all directions. The sea overflowed, the ships were dashed to pieces on the rocks, and few outlived the terrific event, whereby this fertile and blooming island was converted into a desert. Before the earthquake, a pestiferous wind spread so poisonous an odour, that many, being overpowered by it, fell down suddenly and expired in dreadful agonies.[2] Villanius, the historian of Florence, gives an account of a pestilence, which, beginning in Upper Asia, in 1346, spread from Cathay, the ancient name for China, in all directions, nearly depopulating the whole of Asia, and penetrating Egypt, Greece, and Italy, to France, Spain, England, and Germany. It arose, he tells us, from a foul-smelling vapour, which was imagined to have emanated from some fiery body of aerial or terrestrial origin. This gas destroyed all that stood in its way, and horses and cattle suffered severely, but not more so than the human species. Trees, and everything else, for the space of fifteen days' journey around its track, were blighted, and curious creatures, furnished with feet and tails, worms, and swarms of snakes, fell upon the earth. In a short time these putrefied, and the stench from them so infected the atmosphere, that pestilence prevailed everywhere.[3]

This phenomena is one of the rarest that has ever been observed, for nothing is more constant than the composition of the

[1] *Deguignes.* History of China, p. 226. [2] Ibid. p. 225.
[3] *Gio. Villani.* Istorie Fiorentine, book xii. chap. 121, 122.

air; and in no respect has nature been more careful in the preservation of organic life. Never have naturalists discovered in the atmosphere foreign elements, which, evident to the senses, and borne by the winds, spread from land to land, carrying disease over whole portions of the earth, as is recounted to have taken place in the year 1348. It is, therefore, the more to be regretted, that in this extraordinary period, which, owing to the low condition of science, was very deficient in accurate observers, so little can be depended on respecting those uncommon occurrences in the air, should have been recorded. Yet, German accounts say expressly, that a thick, stinking mist advanced from the east, and spread itself over Italy; and there could be no deception in so palpable a phenomenon. Schnurrer and Chalin mention this, and Spangenberg says, 'There were also many locusts, which had been blown into the sea by a hurricane, and afterwards cast dead upon the shore, and produced a noxious exhalation; *and a dense and awful fog was seen in the heavens, rising in the east, and descending upon Italy.*'[1] The credibility of unadorned traditions, however little they may satisfy physical research, can scarcely be called in question when we consider the connection of events; for just at this time earthquakes were more general than they had been within the range of history. In thousands of places chasms were formed, from whence arose noxious vapours; and as at that time natural occurrences were transformed into miracles, it was reported that a fiery meteor, which descended on the earth far in the east, had destroyed everything within a circumference of more than a hundred leagues, infecting the air far and wide.[2] The consequences of innumerable floods contributed to the same effect; vast river districts had been converted into swamps; foul vapours arose everywhere, increased by the odour of putrefied locusts, which had never perhaps darkened the sun in thicker swarms spreading from the east to the west, and of countless corpses, which even in the well-regulated countries of Europe, they knew not how to remove quickly enough out of the sight of the living. It is probable, therefore, that the atmosphere contained foreign, and

[1] *Cyriac Spangenberg.* Mansfeld Chronicle, chap. 287, fol. 336.
[2] *Mezeray.* Histoire de France, vol. ii. p. 418. Paris, 1685.

sensibly perceptible, admixtures to a great extent, which, at least in the lower regions, could not be decomposed, or rendered ineffective by separation. Now, if we go back to the symptoms of the disease, the ardent inflammation of the lungs points out that the organs of respiration yielded to the attack of an atmospheric poison—a poison which, if we admit the independent origin of the Black Plague at any one place on the globe, which under such extraordinary circumstances it would be difficult to doubt, attacked the course of the circulation in as hostile a manner as that which produced inflammation of the spleen, and other animal contagions that cause swelling and inflammation of the lymphatic glands.

Pursuing the course of these grand revolutions further, we find notice of an unexampled earthquake, which, on the 25th of January, 1348, shook Greece, Italy, and the neighbouring countries. Naples, Rome, Pisa, Bologna, Padua, Venice, and many other cities suffered considerably. Whole villages were swallowed up. Castles, houses, and churches were overthrown, and hundreds of people were buried beneath their ruins. In Carinthia thirty villages, together with all the churches, were demolished; more than a thousand corpses were drawn out of the rubbish; the city of Villach was so completely destroyed, that very few of its inhabitants were saved; and when the earth ceased to tremble, it was found that mountains had been moved from their positions, and that many hamlets were left in ruins. It is recorded that, during this earthquake, the wine in the casks became turbid, a statement which may be considered as furnishing a proof, that changes causing a decomposition of the atmosphere had taken place; but if we had no other information from which the excitement of conflicting powers of nature during these commotions might be inferred, yet scientific observations in modern times have shown that the relation of the atmosphere to the earth is changed by volcanic influences. . . . Independently of this, however, we know that during this earthquake, the duration of which is stated by some to have been a week, and by others a fortnight, people experienced an unusual stupor and headache, and that many fainted away.[1] These destructive

[1] *Albert Argentiniens.* Chronic. in *Urstis.* Scrip. rer. Germanic. Francof. 1585.

earthquakes extended as far as the neighbourhood of Basle, and recurred until the year 1360, throughout Germany, France, Silesia, Poland, England, and Denmark, and much further north. Towering icebergs formed at the same time on the coast of East Greenland, in consequence of the general concussion of the earth's organism; and no mortal, from that time forward, has ever seen that shore or its inhabitants. Mezeray says, 'A universal earthquake, even in France and the northern countries, threw down entire cities, tore up trees and mountains, covered the regions of the world with abysses so profound that it appeared as if the infernal regions had opened to swallow up the human species.'[1]

Great and extraordinary meteors appeared in many places, and were regarded with superstitious horror. A pillar of fire, which on the 20th of December, 1348, remained for an hour at sunrise over the Pope's palace in Avignon;[2] a fireball, which in August of the same year was seen at sunset over Paris, and was distinguished from similar phenomena by its longer duration, not to mention other instances mixed up with wonderful prophecies and omens, are recorded in the chronicles of that age. The order of the seasons seemed to be inverted—rains (in Germany these were blood-coloured), floods, and failures in crops were so general, that few places were exempt from them. The consequences of these failures were soon felt, especially in Italy and the surrounding countries, where, in this year, a rain which had continued for four months, destroyed the seed. . . . To attempt, five centuries after that age of desolation, to point out the causes of a cosmical commotion, which has never recurred to an equal extent, to indicate scientifically the influences which called forth so terrific a poison in the bodies of men and animals, exceeds the limits of human understanding. . . . In the progress of connected natural phenomena, from east to west, that great law of nature is plainly revealed which has so often and evidently manifested itself in the earth's organism, as well as in the state of nations dependent upon it. In the inmost depths of the globe that impulse was given in the year 1333, which in uninterrupted

[1] *Mezeray.* Op. cit. p. 418.

[2] *Villani.* Op. cit.

succession for six-and-twenty years shook the surface of the earth, even to the western shores of Europe. From the very beginning the air partook of the terrestrial concussion, atmospherical waters overflowed the land, or its plants and animals perished under the scorching heat. The insect tribe was wonderfully called into life, as if animated beings were destined to complete the destruction which astral and telluric powers had begun. Thus did this dreadful work of nature advance from year to year; it was a progressive infection of the zones, which exerted a powerful influence both above and beneath the surface of the earth; and after having been perceptible in slighter indications, at the commencement of the terrestrial commotions in China, convulsed the whole earth.[1]

Observers have remarked that in many instances the lower animals were strangely affected, and that fatal disease among them either preceded, accompanied, or followed the Black Death. Cutteis, for example, says, 'Rapacious wolves howled around the walls of the cities by night and sated themselves with human blood, though not by hiding in secret places, but by openly bursting into the houses and tearing the children from the breasts of their mothers. And not only did the children suffer from their cruel teeth, but even well-armed men, and they also devoured many bodies by digging up the graves of the dead. They seemed not to be wolves, but demons. Cuckoos and owls, sitting on the housetops by night, used to utter dismal sounds; bats in swarms on the houses, and while building their nests in the roofs, made a strange noise; crows without number, flying about by day over the country, croaked ominously; kites and vultures in great crowds, while soaring in the air, gave vent to doleful cries; and many other birds in the woods, and different brute beasts, coming from their lairs, wandered about the country in great multitudes, giving many extraordinary signs of evil import. . . . In the first place, a virulent plague broke among the brute animals. Scab and leprosy attacked horses, oxen, sheep, and goats, so that the hair fell from off their bodies,

[1] A portion of this description is taken from Hecker's admirable History of the Epidemics of the Middle Ages, translated by Dr Babington, and published by the Sydenham Society.]

and they became emaciated and weak, and after a few days died. Then this fearful pest rushed onwards in its terrific course through the whole world, and raged against miserable man in a most deadly manner.'[1]

At Rome, at the same time as mankind, cats and dogs, fowls, and all other animals, became sick and died.[2] At Gaza, 22,000 people and most of the animals were carried off in less than six weeks.[3] 'As it (the *Sorte Diod*) advanced, not only men but animals fell sick and shortly expired, if they had touched things belonging to the diseased or dead. Thus Boccaccio himself saw, at Florence, two hogs on the rags of a person who had died of plague, and which, after staggering about for a short time, fell down dead, as if they had taken poison. 'What gave the more virulence to this plague was that, by being communicated from the sick to the hale, it spread daily, like fire when it comes in contact with large masses of combustibles. Nor was it caught only by conversing with or coming near the sick, but even by touching their clothes, or anything that they had before touched. It is wonderful what I am going to mention, and had I not seen it with my own eyes, and were there not many witnesses to attest it beside myself, I should never venture to relate it, however worthy it were of belief. Such, I say, was the quality of the pestilential matter, as to pass not only from man to man, but, what is more strange, it has been often known that anything belonging to the infected, if touched by other creatures, would certainly infect, and even kill, that creature in a short space of time. One instance of this kind I took particular notice of. The rags of a poor man just dead had been thrown into the street; two hogs came up, and after rooting about amongst these rags, and shaking them about in their mouths, in less than an hour they both turned round and died on the spot.'[4]

In other places, multitudes of dogs, cats, fowls, and other animals fell victims to the contagion;[5] and it is to be presumed,

[1] *Cutteis.* In Farlato Illyricum Sacrum, vol. iii. *Frari.* Op. cit. p. 314.
[2] *Metaxa.* Op. cit. Vol. ii. p. 141. [3] *Hecker.* Op. cit.
[4] *Boccaccio.* Decameron, Giorno i. introd.
[5] *Auger. de Bitteris.* Vitæ Romanor. Pontificum *Muratori.* Scrip. vol. iii. p. 556.

remarks Hecker, that other epizoöties among animals likewise took place, although the ignorant writers of the 14th century are silent on this point.[1] 'Thus did the plague spread over England with unexampled rapidity after it had first broken out in the county of Dorset, whence it advanced through the counties of Devon and Somerset to Bristol, and thence reached Gloucester, Oxford, and London. Probably few places escaped, perhaps not any, for the annals of contemporaries report that throughout the land only a tenth part of the inhabitants remained alive. . . . . Ireland was much less heavily visited than England. The disease seems to have scarcely reached the mountainous districts of that kingdom. And Scotland, too, would perhaps have remained free, had not the Scots availed themselves of the discomfiture of the English to make an irruption into their territory, which terminated in the destruction of their army by the plague and by the sword, and the extension of the pestilence, through those who had escaped, over the whole country. At the commencement, there was in England a superabundance of all the necessaries of life; but the plague, which seemed then to be the sole disease, was accompanied by a fatal murrain among the cattle. Wandering about without their herdsmen, they fell by thousands; and, as has likewise been observed in Africa, the birds and beasts of prey are said not to have touched them. Of what nature this murrain may have been, can no more be determined than whether it originated from communication with plague patients or from other causes; but thus much is certain, that it did not break out until after the commencement of the Black Death.'

In consequence of this murrain, and the impossibility of

[1] *Hecker.* The knowledge of contagion, especially as applied to an understanding of the diffusion of pestilential maladies, seems in the Middle Ages to have been very exact and comprehensive. Hecker, in treating of this Black Plague of the 14th century, incidentally speaks of Gentilis of Foligno, a celebrated physician, who fell a victim to that disease while attending to the sick. He says of him: 'He believed in a progressive infection from country to country, according to the notions of the present day; and the contagious power of the disease, even in the vicinity of those affected by the plague, was, in his opinion, beyond all doubt (*venenosa putredo circa partes cordis et pulmonis de quibus exeunte venenoso vapore, periculum est in vicinitatibus*). On this point intelligent contemporaries were all agreed.'—*The Epidemics of the Middle Ages.*

removing the corn from the fields, there was everywhere a great rise in the price of food, which to many was inexplicable, because the harvest had been plentiful. By others it was attributed to the wicked designs of the labourers and dealers; but it really had its foundation in the actual deficiency arising from circumstances by which individual classes at all times endeavour to profit. For a whole year, until it terminated in August, 1349, the Black Plague prevailed in this beautiful island, and everywhere poisoned the springs of comfort and prosperity.[1] The diseased cattle were slaughtered, and infected herds were as much as possible separated from those which were sound, while the herdsmen who attended the former were not allowed to come near the latter. 'In the same year there was a great plague among sheep (*lues ovium*) in every part of the kingdom (England), so that in one pasture-land alone more than 5000 died, and their carcases were so putrid that neither beast nor bird would touch them.'[2] Barnes says of the epizoöty: 'And first, by occasion of the plague, the cattle, for want of men to look to them, wandered about in fields at random, from whence nobody drove or gathered them, so that they began to perish among hedges and ditches in such numbers, that it was no less loss than wonder to behold; for there died, in and about one pasture, more than 5000 sheep. Wherefore it might be supposed that they also died in this manner, through some kind of plague that was as strange and unaccountable among them as the former had been to mankind; for it is said that neither beast nor bird of prey would touch the carcases. And this is another instance that the late pestilence doth yet differ from those of other times, since usually beasts, by reason of their prone looks downwards on the earth, and their quicker scent therewithal, are first infected, but here it happened quite contrary. However, there shortly ensued hereby such a scarcity of cattle, that all provisions

[1] *Hecker*, who quotes from *Barnes* and *Wood*. This learned author informs us, on good authority, that 'after the cessation of the Black Plague, a greater fecundity in women was everywhere remarkable—a grand phenomenon, which, from its occurrence after a very destructive pestilence, proves to conviction, if any occurrence can do so, the prevalence of a higher power in the direction of general organic life.'

[2] *Henry de Knyghton*. Op. cit. *Twysden*. P. 2598.

of flesh became excessively dear, as well as other beasts for use and labour. Whereas, in the plague time, partly through their great abundance, and partly, also, because, through the present apprehension of death, men were then less intent upon gain, a good horse, worth forty shillings before, might be bought for a mark; a large fat ox for four shillings, a cow for one shilling, a heifer for sixpence, a fat mutton for fourpence, a sheep for twopence, a lamb for twopence, one stone of wool for ninepence, and other things went at the same rate in England. But now the state of affairs was altered; and, besides the prodigious decay of cattle aforesaid, there succeeded also a great dearth of corn in many parts of the world, not so much through any defect or parsimony of Nature (for the fields were sufficiently clothed with grain in many parts, especially here in England), as partly through an inordinate desire of gain in some, and also partly from the want of men in most places to gather it.'[1]

Adam Murimuth, for the year 1348 (but in reality for 1349), after noticing the unusual fall of rain that occurred in that year, and which continued night and day for a long time, adds: 'At which time a great mortality took place among men throughout the land, beginning in the south and extending northwards, and with such slaughter that scarcely one-half of the inhabitants remained. In certain religious houses two alone survived out of twenty; and, according to some, it destroyed a tenth part of all the inhabitants. It was followed by a plague among animals (*E vestigio lues animalium est secuta*); then the remaining people perished; and the land, robbed of the people who cultivated it, remained sterile, and such great misery followed that the land could never after recover its former state.'[2]

Speed only says with regard to the mortality of cattle succeeding the epidemy: 'It rained from midsummer till Christmas; and so terrible a plague ran through the world, that the earth was filled with graves and the air with cries, which was seconded with *murren* of cattle and dearth of all things.'[3]

[1] *Barnes.* The History of King Edward III. Cambridge, 1688, p. 440. For the revolution in the system of agriculture which this grave pestilence occasioned, see *J. E. T. Rogers.* A History of Agriculture and Prices in England. Oxford, 1866.

[2] *Adami Murimuth.* Chronica.

[3] *Speed.* The Historie of Great Britaine. London, 1632, p. 694.

In the bailiffs of Standon's accounts there is the entry for this year: '*Defectus propter pestilentiam hoc anno;*' and for Wellow, 'High price of tar and fat, due to pestilence, *defectus servientium et magna mortalitas garcionum in patria.*'[1]

Through the courtesy of Henry Harrod, Esq., F.S.A., I am enabled to refer to a paper read by him before the Society of Antiquaries, and entitled 'Details of a Murrain of the Fourteenth Century, from the Court Rolls of a Norfolk Manor,'[2] which will give the student of English epizoöties some idea of the losses incidental to an estate at this period, from what were, in those days, when the nature of animal diseases was scarcely known, termed 'murrains.' The details extend over a period of 63 years; and it is evident that many and various maladies must have been grouped under the vague but terrible denomination. It is but right to mention here that there is no proof whatever that the disease affecting the cattle was *the* Cattle Plague. On the contrary, there is every probability that it was not that malady, from the fact that during this long period almost every kind of domestic animal was affected, and the loss in cattle was never sufficiently great in any one year; while sheep appear to have been the principal sufferers. And there was not one murrain during this long period, but very many; and no doubt the majority of the deaths were due to enzoötic, and, in part, to sporadic affections. However, the account is sufficiently interesting to find a place here, as it may in some degree furnish us with assistance in obtaining a key to the ravages of murrains and their nature in the early centuries of British agriculture, when oxen were so poor and badly fed that six of them were required to draw the rude iron plough-share, and scarcely half an acre could be turned up in a long day's work.

Mr Harrod relates as follows: 'In looking over some Court Rolls of the Manor of Heacham, in the county of Norfolk, I met with some particulars of the murrain during the reigns of Edward III., Richard II., and Henry IV., which I have ex-

[1] *Rogers*. Op. cit.

[2] The Archæologia, vol. xli. 1866. A large portion of this interesting communication I am reluctantly compelled to omit; but the comparative pathologist will find himself well rewarded by a perusal of the Appendix A and B.

tracted, and by the courtesy of the solicitors of Mr Le Strange, the present lord, I am permitted to bring them before the society.

'The accounts taken were extremely minute and careful, and the particulars of the live stock showed all the additions, sales, and losses of every description during the year ending at Michaelmas. To assist the auditors in testing the accounts of the bailiff, the presentments of the losses by murrain appear to have been made on oath at the Manor Courts; another reason, probably, was to absolve the shepherds, who were bond tenants of the manor, from liability on account of the losses when not happening from want of proper care on their part.

'The presentments on the Court Roll commence in the 21st year of Edward III., 1347, and whatever may have been the case in other parts, in this corner of the kingdom the murrain seems to have continued more or less severely during the rest of the reign of Edward III., during the entire reign of Richard II., and until the 13th year of Henry IV., a period of 63 years.

'The bailiffs' accounts for the whole of this period have not been preserved; a portion of them only remains; and from this I have gleaned a few particulars to assist in explaining the entries on the rolls.

'The stock account for the 33rd year of Edward III. shows that at that time there were upon the farm 12 horses and stots (I have treated the animals described 'stots' as horses—not because I believe them to be so in every case where the word is used, but because the Stock Accounts of this Manor clearly designate the horses so),[1] 53 head of cattle, and 7 calves, 733 sheep, and 140 lambs.

[1] The word 'stot' is used in the Scotch lowlands to designate a bullock. I never heard of the term being employed for horses in recent times. In Sir David Lyndsay, however, as well as in Chaucer, horses are so named; and the designation is evidently derived from beyond the border. Chaucer, in the fourteenth century, the period of our Court Roll, when describing the steward's appearance in the Canterbury Pilgrimage, testifies to this:

'This Reevè sat upon a right good *stot*,
That was all pomelee gray (dappled gray) and highte (high-bred) Scot.'

Stot is supposed by Richardson, in his Dictionary of the English Language, to be derived from the Anglo-Saxon 'stod-hors,' and is of course only applicable to

'In that of the 18th year of Richard II. there were 10 horses, 46 head of cattle, and 8 calves, 374 sheep, and 70 lambs.

'I have been unable to find any later accounts of Richard II. or any of Henry IV.

'The great pestilence commenced in London in November, 1348, and the chroniclers generally state that the murrain amongst the cattle commenced at or about the same time, but the first presentment I find about it in the Heacham Court Rolls fixes the commencement of it in that manor in August, 1346, more than two years before.

'This presentment, which was at a Court held the Monday after the feast of the Invention of the Cross, in the 21st year of Edward III., is to the following effect:—"De murina, jurati presentant quod unus bos, tres boviculi, unus stottus, unus hurtardus, tres multones, tres oves matrices, et quinque hogastri moriebantur inter Gulam Augusti et diem hujus curiæ casualiter et non ob defectum alicujus custodie. Item quod sex porculi similiter moriebantur in hyeme non ob defectum, &c. Item quod septem porcelli in hyeme similiter, &c."

'Little more than another month had elapsed when another Court was held on the Thursday after the feast of St Barnabas, when the following presentment appears:—"De murina, jurati presentant quod una vacca post vitulacionem circa festum Sancte Trinitatis moriebatur, unus vitulus similiter moriebatur, septem multones ante tonsionem, novem oves matrices ante tonsionem et agnelacionem, novem hoggastri ante tonsionem, et triginti et sex agni et octo porculi similiter non ob defectum, &c."

'But it is not my intention to place the whole mass of these presentments before you. I have appended a number of them sufficient to show the character of them to this paper—(these extracts include the whole of the entries of murrain for the 21st

horses. He, however, admits that it also refers to oxen, being obtained from the Swedish 'stut' and Danish 'stud,' a steer.

Piers Ploughman writes

'Grace of his goodnesse, gaf
Peers foure stottes.'

Rogers (Hist. Agric.) affirms that stotts were the small rough horses sometimes called 'affiri' in medieval husbandry.—G. F.

and 39th years of Edward III., the 11th and 22nd of Richard II., and the 8th and 9th of Henry IV. It is as well, however, that I should state that every presentment on the Rolls relating to murrain was extracted, and remains in my possession, so that the figures of the general statement can be tested at any time)—and will now merely state that during the 21st year of Edward III. there appears to have died on this farm 1 horse, 7 bullocks, 2 cows, a calf, 48 sheep and 36 lambs, 3 sows, and 43 pigs.

'In the 22nd year, 1 horse, 5 bullocks, a cow, 3 calves, 60 sheep, and 40 lambs.

'In the 23rd year, the year of the pestilence, there is but one presentment, recording the death of 11 ewes and 6 pigs.

'In the following year but a single death, that of a ewe, and in the 25th year nothing whatever, and it might fairly be supposed to have ended. The Rolls for this year and the 29th are not complete; and, since the above was written, a small fragment of one of this year, with the remains of a murrain entry on it, has been found, but too much decayed to make out anything but the marginal note. In the 26th year it begins again, commits more havoc in the 27th year, but less again in the 28th, and the 29th year is again a blank; once more it is rife in the 30th; and in the 31st, 129 sheep and 96 lambs are on the death roll; it has again nearly spent itself in the 35th year, but deaths by it continue in each successive year; and in the 39th the numbers rise again to 152 sheep and 190 lambs. In the 11th year of Richard II. 143 sheep and 113 lambs died.

'During all this time other cattle suffered, but not at all in like proportion to the sheep.

'The effect of its ravages will be better understood by the statement I have carefully prepared from the presentments, which shows the total of deaths of each kind of stock in every year during the continuance of the murrain. It will be seen from it that so late as the 8th year of Henry IV., 8 bullocks, 13 cows, and 66 sheep died, and the account closes in the 13th year with a sow and 3 pigs.

'It will be seen, too, from this account, that among the sheep, the lambs, ewes, and hoggets were most affected by it, and the calves and cows more in proportion than the other stock.

Occasionally, too, the swans and peacocks died from it; a few geese and capons are recorded, but other poultry are scarcely once mentioned. Where the loss has arisen from other causes, and has been accidentally included in the murrain account, the cause of the loss is inserted. In the 42nd Edward III. "*Item octo hyves apum,*" is immediately followed by "per tempestatem yemis."

'But perhaps the most curious fact appearing in these extracts, is that the murrain affected the bees. I began to suspect, when the first few entries of hives of bees fell under my notice, that losses from other causes than murrain were mixed up in these presentments; but two of the 45th year of Edward III. put the matter at rest, as they expressly state that so many "ruscæ apium sunt in morinâ." As many as ten hives were lost in that year, and there was some loss in the apiary nearly every year for twenty years.[1]

'The first presentments I have called attention to were made by the jury or homage of the court, on the Thursday after St Martin, in the 21st of Edward III. The presentment is made by the *coroners*, and so it continues down to the 26th year, when the homage and coroners jointly make it; and on the Wednesday before the feast of St Thomas the Apostle of that year the entry is "Humagium et Coronatores presentant quod Dominus habet in murina viginti et septem hoggastros," &c.

'After this for some years the entry simply states the fact that the lord had in murrain such and such cattle, without expressly stating by whom such presentment was made. In the 46th year of Edward III. new officers appear on the scene. At the court on Monday after the Purification the presentment is made by the bailiff, sub-bailiff, and cadaverators, but during the rest of the reign as before. In the first of Richard II., at the court on Monday before St Wynwaloc the Abbot, the present-

[1] It must be borne in mind that for long before this period, and for some time after, bees formed no inconsiderable portion of the agricultural wealth. All food that required it was sweetened with honey before sugar was had recourse to, and into the composition of many of the Saxon beverages that article largely entered. Therefore it was that a mortality amongst the bees was considered a somewhat serious calamity, and of sufficient importance to obtain a notice in the chronicles of the period. But there was evidently no relationship between the *morinâ* of the bees and that of the sheep and cows.

ment is made by the whole homage with the *cadaverators*, and by these latter many of the subsequent presentments are made.

'I presume these officers had the charge of the disposal of the carcases of the cattle dying of murrain, and I occasionally met with their election by the homage of the courts, as on the Tuesday after St Valentine 7th Richard II.—"They elect John Barnege and Geffrey Cay into the office of cadaverators, who say, &c.;" and again in the course of the following year—"They elect John Baronne and Geffrey Cay into that office, and they are sworn, &c."

'From the two bailiffs' accounts I have before referred to, the 33rd Edward III. and the 18th Richard II., it will seem that the stock on the farm had considerably diminished, the sheep in the latter account amounting to only about half the number mentioned in the former. The purchases of stock were less on some occasions, the lambs much less numerous, and many ewes are stated to have been sterile; and I also observe such entries as, that a dozen very sickly hoggets were sold "pro timore morinæ." These particular ones were sold at 3¼*d.* a head, the current price at that time being 17*d.* If they were (as it seems likely they were) affected with the disease, it was a ready way of spreading it.

'I trust I have sufficiently shown, without troubling you with a mass of extracts (of which those in Appendix B are not a twentieth part), that the murrain mentioned to have occurred in 1348, and those of 1363 and 1369, were really one continuous visitation.

'It is quite certain, that on this one farm in the western part of the county of Norfolk it commenced in 1346, and continued rising and falling in intensity, until it almost suddenly ceased in November, 1411. So accustomed had people become to it by the 44th Edward III., that it is spoken of as the "common murrain," and although it does not appear to have swept off the entire flock, as in the case mentioned by Knyghton, the aggregate loss is very large, and if the numbers lost on other farms bore any proportion to these, the effect in such a county as Norfolk must have been very serious.'[1]

[1] Mr Harrod appears to have been fully impressed with the idea that the term 'murrain,' employed so frequently in this roll, could refer to nothing but the Cattle

A.D. 1349. 'In this year the contagion (of the plague) penetrated to the city of Zara, the capital of Austrian Dalmatia, and produced extreme terror, as well as mortality, killing more than two thousand people. At the same time, a *ferocious* epizoöty broke out over the whole country, which destroyed nearly all the animals.'[1] In England, 'great rains from St John's day to Christmas, so that a day scarcely passed in which it did not rain either by day or by night. From this intemperance a great mortality of people ensued; according to some scarcely a tenth of the population were left; cattle mortality followed.'[2] 'Severe diseases seized the cattle throughout the counties of Somerset and Devon, and a great mortality took place among them, which was the origin of taking gold in payment for cattle from Englishmen.'[3] This last has reference to the intercourse between England and Ireland.

A.D. 1350. 'A grievous plague (in Germany), so that death oppressed both man and beast.'[4] 'There was a great famine in Barbary and Morocco; to supply which Christian nations transported such quantities of corn as made it too cheap and plentiful there, but left a famine at home. This was followed by terrible inundations, storms, and tempests; by fearful meteors of flames, and fire in the air. These were succeeded by excessive drought and want of water; from all which followed the destruction of most animals and vegetables. This year the great plague reached Coventry.'[5]

A.D. 1352. 'So droughty a summer, that for want of water much cattle died in the pastures; the fens and marshes were so dried, that there was a way where there was none before.'[6]

A.D. 1353. At Cremona, near Mantua, a mighty storm of hail which destroyed cattle and people, and even damaged houses. Some of the hailstones weighed eight pounds, and their general weight was one pound.[7]

A.D. 1356. 'A fearful plague in Germany, which was pre-

Plague which was so destructive in this country when his interesting paper was published.

[1] *Frari.* Op. cit., p. 315. [2] *Otterbourne.* [3] Iola *MS.*
[4] Chronic. *Langebek.* Vol. i. p. 58.
[5] *T. Short.* Op. cit., vol. i. p. 177. [6] Ibid.
[7] *Barnes.* Op. cit.

ceded by an eclipse of the sun and moon, and great earthquakes, by which many castles and other buildings were thrown down. The pestilence that followed first attacked the flocks of sheep, then passed on to the cattle, and finally destroyed a great multitude of men.'[1]

A.D. 1360. 'There was a great dearth this year, and mortality of people, called the "second plague," because it was the second in the reign of Edward III., and a very great death of cattle and horses. Six thousand horses died in the army; many houses were burnt by thunder and lightning; many strange meteors were seen in the air.'[2]

A.D. 1363. Under this date, William of Worcester mentions a great epizoöty among animals in England. 'In this year, the twenty-eighth year of King Edward's reign, there was a severe scarcity of corn in the summer, and a great murrain of animals (*magna morina animalium*).'[3]

A.D. 1366. A disease, or, as it is called, a battle, among sparrows. 'This year fell abundance of rain in time of hay harvest, whereby much hay and corn was lost. This year also happened a great quarrel among the sparrows, which came to a decisive battle, wherein not numbers, but great heaps, were killed. A great mortality of people followed, so as many who went well to bed at night, were found dead next morning.'[4]

A.D. 1369. In England, a great mortality in man, 'and likewise a marvellous murrain upon cattell, so that the like had not been seen in many years before.'[5]

A.D. 1370. 'This year began the next great plague, called the third mortality. This was very great, both of people and cattle; the like seldom heard of. The west country, as Oxford, was most afflicted by it.'[6]

A.D. 1375. An epizoöty among deer, roebucks, hogs, hares, and foxes in Germany, according to the report of Gassari. Mencken says, 'There was a contagious disease which destroyed

[1] *H. Mutius.* Chronic. Pistor. Scrip. rer. German. Edit. *Struve.* II. p. 896.
[2] *T. Short.* Op. cit., vol. i. p. 178.
[3] *Wilhelmi Wyrcester.* Annales Rerum Anglic.
[4] *T. Short.* Op. cit., vol. i. p. 180.
[5] *Grafton.* Op. cit.
[6] *T. Short.* Op. cit., vol. i. p. 180.

stags, wolves, fawns, bears, goats, wild boars, hares, and foxes. I find in the old chronicles that the native hunters were not astonished at this mortality.'[1]

A.D. 1383. 'This Lent, the Duke of Lancaster, and the English army, lying on a marshy ground in Scotland, had a great loss both of men and horse, from the extraordinary cold and wet.'[2]

A.D. 1385. In the accounts of Alton Barnes, Mr Rogers finds the following item: 'Great mortality among sheep—15 per cent. of sheep, 55 of lambs, died.'[3]

A.D. 1385-7. 'The greater portion of the bovine species in the State and episcopate of Placentia died; and the same thing happened, though to a greater extent, in the States of Lombardy. All the fowls, too, died, from a contagious disease; so that when one began to die, they all died.'[4] In the same years there was much disease in mankind at Mallorca, Lisbon, and Gallicia, and influenza was very prevalent.

A.D. 1386. A murrain of cattle in England.[5]

A.D. 1389. 'March 5th, rose a sore and terrible wind, which overthrew houses, broke and rent trees, and destroyed much cattle. This was followed by a great mortality and plague; much youth died everywhere in cities (from anginas and dysentery), towns, and country. After this a great dearth of corn. . . . Whilst the king was at Sheen, in July, in his court were seen such swarms of flies and gnats skirmishing with one another, that in the end their killed were swept away with brooms, and bushels were filled with them.'[6] A murrain among deer in England: 'Murrena damarum ferarum.'[7] The farm accounts of Alton Barnes, according to Mr Rogers,[8] exhibit the following entry: 'Scab and sickness very prevalent among sheep.' Those for Letherhead have the same report.

A.D. 1390. When King Edward was on his march to Chartres, a terrible storm of thunder and lightning overtook his army, and killed six thousand horses and one thousand men.

[1] *Mencken.* Vol. i. p. 1516.
[2] *T. Short.* Op. cit., vol. i. p. 182.
[3] *Rogers.* Op. cit.
[4] *Muratori.* Chronic. Placentia.
[5] *H. de Knyghton.* Op. cit.
[6] *Baker.* Op. cit.
[7] *H. de Knyghton.* Op. cit.
[8] Hist. Agricult.

A.D. 1392. 'During the whole of the past summer, the largest rivers of France, which carry the tribute of their waters to the sea, were dried up, and could no longer serve as transport. Not only did no rain fall, but the earth scarcely furnished the springs with water. In certain places this famine of water made great ravages among the flocks, which died of thirst on the banks of fountains and streams, or succumbed to contagious maladies.'[1]

A.D. 1401. In England, 'the insects of leaves did immense injury throughout the country, by consuming the leaves and grass to such an extent that no provender was left for cattle.'[2] They were destroyed by lime, which likewise fertilized the ground, and is said to have given origin to lime manuring.

A.D. 1407. 'A long and severe winter in England. Frost and snow lay all December, January, February, and March. Thrushes, blackbirds, and many thousands of smaller birds died from hunger and cold.'[3] In Ireland, 'very inclement weather, and a great destruction of cattle in this year.'[4] 'There was foul and bad weather this year, and a great murrain of cattle.'[5] A pestilence in Wales from a putrid fish which was cast ashore.[6]

A.D. 1414. According to Saxo Grammaticus, a severe form of dysentery ravaged Germany, affecting horses, cattle, dogs, and cats, as well as man.

A.D. 1423. The priory of All Saints, which stood upon the site now occupied by Trinity College, Dublin, 'was reduced to such a state of misery, by the unfruitfulness of the seasons, by the mortality of men and cattle,' and other circumstances, that the revenue of the establishment was insufficient for its support.[7]

A.D. 1425. 'Very inclement weather in Ireland this year from November 1st to May, which caused a great destruction upon cows, and delay in ploughing throughout the island, and loss of people.'[8]

A.D. 1430. An epidemy in Italy, and soon after ('31) a great

[1] Chroniques de St Denys, ii. p. 45. Edition, 1840.
[2] Iola *MS.*
[3] *T. Short.* Op. cit., p. 185.
[4] Annals of Connaught.
[5] Annals of Clonmacnoise.
[6] Iola *MS.*
[7] Registry of the Priory of All Saints. Irish Archæol. Transactions.
[8] Annals of Clonmacnoise.

mortality of people at Augsburg, in Germany, succeeded by a serious epizoöty among horses. 'Et sicuti superiore æstate homines, ita hac equi apud nos sua quadam strage magno numero periere.'[1]

A.D. 1433. In Germany, a severe winter, inundations, famine, and a mortality among cattle.'[2]

In Spain, 'in the month of January, 1433, there happened in the kingdom of Aragon and Navarre a terrible snow-storm (*nevasco tan furioso*), which continued for forty days, and during which there perished a vast number of people and cattle; though whether this loss arose from the great cold, or from some epidemic and epizoötic diseases occurring at that time, is not known.'[3]

A.D. 1434. In Ireland, 'a great frost commenced at the end of this year, *i.e.* five weeks before Christmas, and it continued seven weeks after it; and droves of cows, and troops of horses and people, used to pass upon the chief lakes of Erinn; and there was great slaughter brought upon the birds of Erinn by that frost.'[4]

A.D. 1441. During the reign of Frederick III. an epizoöty of all the domestic animals broke out in Germany, consequent, it would appear, on inundations, caused by long rains and the overflowing of rivers. It was apparently a violent form of dysentery. Saxo attributed it to the corruption of the water and the general unhealthiness of the pastures and fruits.[5]

A.D. 1442. In Germany, a severe epizoöty among cattle (*mortalitas boum*), following the appearance of a comet which was visible for fourteen nights.[6]

A.D. 1443. For Ireland it is recorded: 'A rainy tempestuous year after May, so that very many fishes multiplied in all the rivers in Ireland, and it much hurted both bees and sheepe in Ireland also.'[7] This is the third epizoöty of bees and the

[1] *Gassari. Mencken.* Scrip. i. p. 1581.
[2] *Spangenberg.* Mans. Chronic.
[3] *Villalba.* Epidemiologia Española, i. p. 95.
[4] Annals of Ulster.
[5] *Michael Saxo.* Chronic. Cæs. *Spangenberg.* Op. cit., p. 380.
[6] *Cosmæ.* Prag. Chronic. *Mencken.* Scrip. rer. German., i. p. 1992.
[7] *Mac Firbis.* Annals of Ireland.

second of sheep in Ireland. In Italy, Gaul, Germany, Spain, and other countries, and also in Asia, famine and plagues reigned for nearly seven years. At this period Don Alonzo V., King of Aragon, surnamed The Wise, subdued the kingdom of Naples. In consequence, however, of a stubborn resistance shown in the province of the Abruzo, and the toil and hardship inseparable from a desperate and lingering war, the cavalry, almost the only arm employed, suffered very much, the horses dying by hundreds from an epizoöty of a particular character. The king, in view of this great mortality, ordered his major-domo, Manuel Diaz, to assemble all the veterinary surgeons of the cavalry to investigate the nature of the malady, and to compose a book on veterinary medicine. This order was complied with, and veterinary science thereby received a fresh impulse, as is noted in the Spanish Hippatria, or veterinary manual of Spain.[1]

A.D. 1445. 'A great mortalitie of the cattle throughout Ireland; both want of victuals and dearth of corn in Ireland also.'[2]

A.D. 1450. In Ireland, 'a hard warlike year was this, with many storms and great losse of cattle.'[3]

A.D. 1456. In this year a comet appeared which struck terror throughout Europe, already in a sad state of consternation from the inroads of the Turks. Pope Calixtus III., as superstitious as the ignorant masses, or desirous of gratifying them, ordered a prayer, in which he conjured the Turks and the comet alike. The wheat was all destroyed by red blight.

A.D. 1462. 'Greate frost in this yeare that slaughtered many flocks of birds in Ireland.'[4] Fabyn speaks of the King of England, Edward IV., being in this year 'vysyted with the sykenesse of pockys (small-pox).'[5]

A.D. 1464. An epidemic colic or cholera in Ireland, which

[1] *Villalba.* Epid. Españ. i. p. 98. This work was written in the Limousin-Catalane dialect, and was multiplied by many written copies. At a later period it was translated into Castilian and printed. Perhaps the earliest edition is one that had the following title: Libro de Albeyteria, por Don Manuel Diaz. Çaragoça, 1495. Another addition, corrected, appeared at Toledo, in 1511.

[2] *Mac Firbis.* Annals of Ireland. [3] Ibid. [4] Ibid.

[5] *Fabyn.* Chronicle. London, 1559. Vol. ii. pt. 7.

likewise attacked the lower animals, and was believed to be infectious, for we read that 'Murtagh, the son of Art O'Melaglin, and his wife, daughter of O'Coffey, and three others besides, died in one day, from having seen a horse that had perished of *the same spasms.*'[1] In another record it is stated that these people died from looking 'at a horse which died of the *same lumps;*'[2] and another has it, 'it was said that the occasion of their death was their coming to see a horse that perished by some swelling knobs.'[3] Might this not rather be anthrax or farcy which affected the horse? From the sudden death of the people mentioned, I think there is every probability of its being the former contagious malady.

A.D. 1473. In Ireland, 'a great destruction of cows (*Bo-dhith*) this year.'[4]

A.D. 1479. 'In this year was great mortality and death by the pestilence, not only in London, but in divers parts of the realm, which began in the latter end of September in the year last before passed, and continued all this year till the beginning of November, which was about fourteen months, in the which space died innumerable of people in the said city and elsewhere.'[5]

A.D. 1480. A murrain among cattle in England.[6] The preceding summer had been very hot, and there was a great drought. This year was very wet, and there were extensive inundations of the Tiber, the Po, the Danube, the Rhine, and most of the other great rivers. Famine and disease followed, from the destruction of the crops and the saturation of the air with moisture.[7] In

[1] Annals of the Four Masters.

[2] Annals of Connaught.

[3] *Mac Firbis.* Op. cit.

[4] Annals of Connaught.

[5] *Holinshed.* Op. cit.

[6] The Royal Commissioners in their First Report published in October, 1865, think that this murrain, as well as that which appeared in 1348-9, was analogous to, if not identical with, the Cattle Plague then devastating England. Of this I cannot find the slightest proof, for the symptoms of diseases in these early times are, except in rare instances, so obscurely enumerated, if at all, that we might as well believe them to be eczema epizoötica, epizoötic dysentery, epizoötic anthrax, or any other likely malady. From the fact that almost every kind of animal was attacked by disease during the Black Death, it seems exceedingly probable that the *panzoötic* malady was similar to that in man. I may add I am unable to find any mention of this epizooty besides that in the report of the Commissioners, though I have made diligent search for it.

[7] *Werlich.* Chronica. Statt. Augsburg, p. 236. *Spangenberg.* Op. cit.

Switzerland and Southern Germany malignant epidemics appeared in this year and the next, and putrid fever raged in mankind in Westphalia, Hesse, and Friesland.[1] There had never been in the memory of the inhabitants so many *ignis fatui* seen as during this period. In France, under the oppressive reign of Louis XI., famine, disease, and misery. The peasantry south of the Loire had nothing to eat but the roots of wild herbs. In many places women and children were obliged to draw the plough, *from the want of draught cattle;* they were obliged, too, to carry on the cultivation by night, that they might not be observed by the king's inhuman revenue officers.[2]

A.D. 1481. Drought and famine in Switzerland and Germany, and putrid fever in the human species in Westphalia, Hesse, and Friesland. The harvests failed. Unprecedented appearance of *ignis fatui* in these countries, which had been ravaged by innumerable swarms of locusts for some years. There was also a very grave plague amongst animals, which caused the loss of one-third of their number.[3]

A.D. 1490. An earthquake in Sligo. 'Many horses and cows were also killed by it, and much putrid flesh was thrown up; and a lake in which fish is (now) caught, sprang up in the place.'[4]

A.D. 1491. The sweating sickness in mankind in Ireland. 'This year there was such a famine that it was called the "Dismal year."'[5] In 1491 appeared a comet; the season was very wet; an epidemic swept away cattle, and a famine afflicted Ireland.'[6] 'There was a comet in Poland, with a great eclipse of the sun. Afterwards there was a great dearth of cattle.'[7]

A.D. 1492. In Ireland, 'this summer was so dry, that abundance of cattle perished for want of water; and the air grew so pestilential that a multitude of people, and particularly the Lord of Slane, died of the plague.'[8]

[1] *Franck Von Wöed.* Chronica. Zeytbuch und Geschychtibitel. fol. 211.
[2] *Mezeray.* Loc. cit., vol. ii. p. 720. *Hecker.*
[3] Annals of Langebek, vol. i. p. 195. [4] Annals of the Four Masters.
[5] *Smith.* History of Cork.
[6] *Webster.* A Brief History of Epidemic and Pestilential Diseases. London, 1800. Vol. i. p. 238.
[7] *Functius.* [8] Hibernica Anglicana.

A.D. 1495. Locusts in Spain. In the preceding year there was a severe mortality amongst wild animals (*sylvestrium animalium mortalitas*), presaging (it was remarked) the bubonic plague which occurred this year in the human species.[1]

A.D. 1496. In Ireland, 'Great inclemency this year, so that great destruction was brought upon cows and all other beasts. A great dearth (*ascolt*) throughout nearly the whole of Erinn this year; and a great hindrance to fattening this year. Great inclemency in the autumn of this year, by which all men, and particularly in Fermanagh, were ruined in respect to their corn.'[2]

A.D. 1499. In Germany there was a dreadful murrain in cattle, and people were much afflicted by pestilence. Vegetation was nearly destroyed by blights and caterpillars, and mould-spots, or *signacula*,[3] were observed in France and Germany. Schenkius tells us that famine reigned in many parts of Europe, accompanied by disease. The preceding winter had been so severe as to kill nearly the whole of the brute creation, and the summer was so intensely hot, that trees were set on fire by the heat of the sun.[4]

[1] Chron. Monast. Mellic. Pez. Scrip. rer. Austriac, vol. i. p. 273.

[2] Annals of Ulster.

[3] The exact nature of these *signacula*, or blood spots, does not seem to have been investigated until 1819, when, in Padua, a farmer having experienced great alarm from discovering crimson spots, like blood, on his maize porridge, a commission of scientific men was appointed to investigate the alarming phenomenon. One of the commission, M. Sette, imagined the vivid patches to be composed of microscopical fungi, which he designated *Zoogalactina imetrofa*. The renowned Ehrenberg, however, considers them to be made up not of fungi, but a kind of animalcule which he named *Monas prodigiosa*, from its extreme minuteness. Like the blood corpuscles, these creatures when examined individually appear as transparent and without colour, but when viewed as a mass have the tint of blood. In size they are from the three-thousandth to an eight-thousandth part of a line in length, and a cubic inch is supposed by the great microscopist and naturalist to be capable of containing from 46,656,000,000,000 to 884,836,000,000,000 of these animated specks.' *Passat Staub und Blut-regen*. Berlin, 1849. *Hist. Influenza.*

[4] *Schenkius.* Hist. Gen. Hanover.

CHAPTER III.

PERIOD FROM A.D. 1500 TO A.D. 1700.

We have now advanced so far in the history of epizoötic maladies that it would seem desirable to pause, as we find ourselves leaving a most unprofitable era, and about to enter on the threshold of one pregnant with great results to the sciences in general, but especially to that of medicine. We have glanced, furtively it may be, at the position of veterinary medicine in the beginning of the Christian centuries, and found that it occupied a place among the sciences of the Greeks and Romans. From the Egyptians, the Greeks had no doubt borrowed very much of what they knew of the diseases pertaining to the domestic animals, and they had been, with their love for learning of all kinds, and their great regard for the welfare of the social quadrupeds, most careful in not only treasuring up this knowledge, but adding to it.

The Romans not only copied what the Greeks knew, but employed the most skilful Greek veterinarians in their armies, and some of the writings of these men, as we have seen, are yet extant. The diseases of the horse and ox were found to be particularly worthy of study, as a vast amount of national wealth was invested in these animals; and also because, from the hazards of war, and the little advance agriculture and the study of the laws of health had yet made, they were particularly liable to attacks of disease which destroyed vast numbers, and rendered attempts at

remedial measures really of great moment. Before the Christian era, and up to the fourth century, there were veterinarians, and even veterinary schools, and physicians acquired much of their learning from the study of animal medicine. But on the death of Augustus and the fall of the Roman Empire, the progress of learning and the arts sustained a sad reverse. The horrors and the desolation attendant upon the invasion of this ancient but advanced civilization by the Goths and Vandals in the sixth century, buried all in gloom. This great revolution, which marked the termination of an antiquated civilization in as great obscurity as it had begun, was quickly succeeded by a startling event—the commencement of modern history in the midst of this confusion, and the appearance of a new dominant race, the Arab, ruling over many of the semi-civilized and barbarous tribes dwelling in Europe, Asia, and Africa. A new religion stimulated this people to conquest, and Mahomet propagated his creed sword in hand. Under his successors, the remaining Alexandrian library —containing, it is said, 700,000 volumes—was burnt, and the treatises on medicine which escaped destruction were but few. Medical science made scarcely any progress in the changes and contentions which ensued for supremacy.

The Goths were a nation of warriors, who forbade their children the knowledge of reading and writing, or any other kind of learning, save that pertaining to the use of warlike weapons; believing, as they did, that education and the arts and sciences had enervated and made effeminate the strength and bravery of the Romans. True it is, that in the days of the Byzantine empire veterinary medicine was in a somewhat flourishing condition, having such representatives as Apsyrtus, Hippocrates, Theomnestus, and others, and in general was in advance of human medicine, until the fall of that empire. But neither were in very promising state, and in Europe the Arabs were but slow in making their learning known, though in 980 Avicenna had written his celebrated system of medicine. When the Byzantine empire was finally demolished, learning may be said to have slumbered. But by degrees, though slowly, it began to awake, and the arts tardily commenced to revive; yet, under the Saracens, that most essential branch of medical study, anatomy, was

absolutely neglected, the Koran peremptorily forbidding the touching of dead bodies, much less their dissection. It was not till the middle of the fifteenth century that human medicine had sufficient attention bestowed on it to redeem it from almost utter neglect; though veterinary medicine was yet in advance. Jordanus Ruffus, Laurentius Rusius, and others of this period, excelled the most noted physicians in simply and faithfully describing the diseases of the lower animals; and even the Arabs had far more love for the horse than their own species; for their writings having reference to its maladies are numerous and more complete than those referring to man. One cause of this revival was, doubtless, due to the influence the Crusades had in carrying back from the Holy Land copies of such writings as those of Aristotle, and the works of Arab physicians. But, perhaps, the greatest impulse the arts and sciences then received, was that derived from the refugees from Greece and elsewhere, particularly after the capture of Constantinople by the Turks in 1453. The manuscripts and the monuments of skill and learning which they carried to Florence, the City of the Arts, were a grand nucleus for the expansion of human wisdom and enterprise. In 1506 the writings of Dioscorides, the physician and botanist of Greece, were published; in 1525 those of Galen, another and a greater student of physic; and in 1526 the works of the immortal Hippocrates, the father of medicine, were given forth to the world in numerous copies of clear letter-press. Western medicine begins with the school of Salerno, where physic was taught on the Greek principles. The medical school of Montpellier was founded in 1150, that of Paris in 1220, and Bologna at the commencement of the 14th century, about which period anatomy was greatly improved by Mondini. The titles of bachelors and doctors of medicine were conferred, for the first time, in the University of Paris in 1231. The reign of Henry VI. was remarkable for the patronage afforded to practitioners in human medicine, and every aid was afforded to the development of that science which may be said to have the prolongation of life, and the maintenance of health for its chief study.

This backward glance at the long period we have passed over, will explain the absence of details, or of exact information,

as to the nature of the epizoöties which have been enumerated. All we can glean from the deep obscurity are the facts, that in those centuries, as in later, the bovine species has been most liable to attacks of fatal and wide-spread disease, possibly to some extent from their peculiar temperament and phlegmatic constitution; that very many of these bovine plagues could be traced to the East, just as Pliny had traced the origin of the typhus or putrid fever of man which appeared in Italy to the same quarter long before; that, usually, they were of brief duration, for the very good reason that they generally exterminated the whole of the herds they attacked, and that speedily; that the equine species have been least affected by these visitations; and that France and Germany were more frequently the ground of their selection than other countries.

Unfortunately, in the next period, we find veterinary medicine nearly at a stand-still, but human medicine making rapid strides. The consequence is, that while the more serious epizoöties have been studied by physicians, who, we may surmise, had not given comparative pathology their attention until called upon to investigate these invasions of disease, much that is valuable and of a practical nature has been overlooked. But there is much more exactness in the symptoms described, and often we have the history of the disease accurately traced from beginning to end, with not unfrequently the effects of remedial measures. Italy continued to be the chief, if not almost the sole, refuge for veterinary science, and Naples was more particularly the great school of equitation and animal medicine for the whole of Europe; though the writings of the Greek and Roman hippiatrists, and those of Ruffus and Rusius, were yet the text-books for general reference. Towards the sixteenth, and during the seventeenth centuries, we have abundant evidence, from the numerous treatises published on the continent and in this country, that much attention was being directed to this branch of science; but there was little originality or real progress; anatomy was greatly neglected; and, altogether, veterinary was in a much less satisfactory condition than human medicine.

A.D. 1500. This century began with much inclemency of weather, which caused great destruction to cattle, and was fol-

lowed by a series of severe epizoötic diseases. According to Hecker, evil was prognosticated by a comet.[1]

In Ireland 'great inclemency (*doineun*) this year, which killed almost all the cattle of Erinn, and prevented the earth's responding to the husbandman.'[2] Spain was said to be ravaged by rabies canina.[3]

A.D. 1501. Tremendous inundation in Silesia. As a consequence, an epizoöty among cattle and many other kinds of animals.[4]

A.D. 1504. Great drought, failure of the crops, and mortality amongst cattle in Saxony.[5] 'And in this year there was a cold winter; thereupon followed a very hot and dry summer. For many months, from the beginning of April to the end of July, there was no rain. The sky was cloudless, the sun was glaring and hot, whereby the grass was scorched, so that there was no hay or lattermath. The oats failed, and other crops were little more fruitful. Hereupon followed a great scarcity. Pigs died in large numbers. Many farmers drove out fine herds in the morning, of which one-third did not return at night. Neither had the previous great mortality ceased, but, owing to the intense heat, it rather increased; so that in some places the half, in others one-third, of the people died. . . . . 1505. A very wet summer. Then came the pestilence, which had already lasted several years. It was now more severe amongst the cattle than it had hitherto been, and among men it was none the less so.'[6] There was a great invasion of caterpillars in Northern Germany, which destroyed all the foliage. Signacula, or blood-spots, which Agricolo supposed to be lichens, so abounded on linen, the veils of women, the food, and even in the air, in the form of *blood-rain,* as to cause great fear.[7] The great murrain among the cattle at Meissen, in Saxony, led to the execution of some *böse buben,* or supposed miscreants, who were suspected

[1] *Hecker.* Epidemics of the Middle Ages.
[2] Annals of Ulster.
[3] *Blaine.* Canine Pathology.
[4] Chronic. Princep. Polon. *Stenzel.* Vol. i. p. 168.
[5] *Fabricius.* Annals Misn. p. 170.
[6] *Spangenberg.* Mansfeld. Chronic., book i. p. 402.
[7] *Mezeray.* Op. cit., p. 819.

of poisoning the pastures. Wirth thinks the malady was 'milz-brand,' or splenic apoplexy—a form of anthrax.

A.D. 1508. The summer very wet; inundations. In Austria an epizoöty amongst cattle and hogs, which was named *lues intercus*—plague, or dropsy under the skin.[1] Locusts devastated Spain, and epidemic pestilence followed.

A.D. 1513-14. After a severe winter, a sudden thaw, famine, rains, and inundations, an epizoöty, contagious in its nature, appeared in Friuli, from whence it spread to the States of Venice, thence to Verona, and at last to France and England. An epidemic in mankind raged at the same time in Italy and in England.

Fracastor, who is the first writer to give detailed symptoms of these animal plagues in modern times, describes the malady. He says: 'We refer to the unusual contagion of the year 1514, which attacked oxen alone. It was first seen in the country around Friuli, and gradually, but yet rapidly, was it carried to Venice, and from thence to our own country (Verona). The ox at first, and without any manifest cause, ceased to eat. But the herdsmen noticed in those infected a certain roughness and small pustules over the whole mouth and palate (*asperitas quædam et parvæ pustulæ percipiebantur in palato et ore toto*). It was necessary to separate those infected from the rest of the herd, otherwise the whole became contaminated. By degrees the spots or pustules descended to the shoulders, and thence to the feet. Almost all in which this symptom was noticed recovered, but of those who did not exhibit this extension of the eruption the greatest part died.'[2] No treatment of the malady is indicated. In recent times the nature of this pest, as described by Fracastor, has given rise to some discussion. Paulet, who has given us a classical work on epizoötic diseases, says that 'la maladie en question n'étoit autre chose qu'une *fièvre pestilentielle exanthématique*, qui se terminoit par une éruption critique aux parties antérieures du corps, de la même manière que les *fièvres éruptives* qu'on observe sur les hommes, telles que la petite vérole, la rougeole, les fièvres pourpreuses; mais elle ressemble encore

[1] Chronic. Mellic.

[2] *Fracastorus*. Tract. de Contagiosis Morbis, lib. i. cap. 12.

plus particulièrement à cette fièvre de Sydenham;[1] ou miliaire maligne, décrite par Hamilton,[2] Allioni,[3] et surtout par Walthierus,[4] qui a observé que toutes les fois que l'eruption se faissoit du côté du visage, ou qu'elle occupoit les oreilles, le cou, les bras, l'étoit la meilleure crise qu'on pût espérer, et celle qui sauve ordinairement les malades. Hippocrate porte le même prognostic dans les squinancies, lorsque l'humeur morbifique se manifeste au-dehors.'[5] It may be observed that this author designated the Cattle Plague or Rinderpest a *Phlogoso-gangréneuse*. Dupuy[6] (who termed the Cattle Plague a *Cachexie* or *Diathése Varioleuse*) and others think it was variolous in its nature. Lorinser[7] imagined it must be the *contagious typhus*, or Cattle Plague; and others, again, that it was glossanthrax. A few are of opinion that Heusinger[8] was right in declaring it to be a malignant form of *Stomatitis aphthosa;* but one cannot help concluding, from the symptoms enumerated, the contagious character of the malady, its great mortality, and its likeness to the plague which threatened to decimate our herds in 1865, that those who assert its identity with the Rinderpest are justified in doing so. Though Fracastor, in one part of his treatise, asserts that oxen alone were affected, yet in another he says that not only did the plague sweep away 'the wretched cattle, but also nearly the whole of the unhappy flocks of sheep.' This gives additional evidence as to the disease being the veritable Plague; though, as will be subsequently noticed, diseases of a pestilential kind were prevalent among sheep from the beginning of the century. Besides, the archives of the Imperial Agricultural Society of Southern Russia mention that the 'Cattle Plague' appeared in Spain at this period; so that Europe may have again been widely devastated by this scourge.

And Schenkius[9] informs us that at this time Venice and Padua

[1] *Sydenham.* De Nova Febris Nigressu Schedula Monitoria.
[2] *Hamilton.* De Febre Miliari.
[3] *Allionni.* Febris Miliari Tractatio, No. 76.
[4] Medic. Germani, p. 151. [5] *Paulet.* Recherches, &c., vol. i. p. 37.
[6] *Dupuy.* Traité sur les Maladies Epizoötiques. Paris, 1836.
[7] *Lorinser.* Die Rinderpest.
[8] *Heusinger.* Recherches de Pathologie Comparée, vol. ii. p. 165.
[9] *Schenkius.* History of Hanover, chap. xi.

were visited by a malignant epidemic dysentery, from the people having eaten the flesh of some diseased cattle that the butchers had imported from Hungary. The squabble between the butchers and the populace was serious.

Forster[1] and Webster[2] mention an epizoöty, or 'distemper,' as having destroyed much cattle in England in this year. They also notice an epizoöty among cats in England, but unfortunately they neither give their authorities, nor do they describe the symptoms.

A.D. 1515. There appeared this year in France, though it had been noticed here and there since the commencement of the century, a disease amongst sheep, which was contagious and very dangerous. It was named *febris pestifera, vari nigri,* or more commonly the 'Tac;' a term, it seems, for a pestilential disease which had appeared in the human species in 1411.[3]

Gesner, in his 'Historia Animalium,' makes mention of the disease as scabies: 'Scabiem ovium Galli vocant *Tac.*' Ambrose Paré[4] says that the *Tac* usually appears in the pestilential fever (of man), and sometimes before the tumours or carbuncles become apparent: 'In some cases there are eruptions on the skin similar to the bites of fleas or bugs; sometimes, also, there are elevations like small millet-seeds or the small-pox of children. . . . . The vulgar call them the *Tac,*' &c. Belon, a learned physician, who wrote a work on medicine[5] in the 16th century, in speaking of the 'Tac' oil (*huile de tac*), says that this substance was so named because it was employed in the treatment of a disease of that name, 'a pestilential disease which attacks and kills sheep.' 'The peasantry of Celtic Gaul,' he further observes, 'knowing better than we how to cure it, go to the apothecaries and ask for the *Tac,* which is an empyreumatic oil, obtained from juniper wood, and which is designated *Cade Serbin* in the South of France, a name borrowed from the Jews.' In Languedoc and other parts of France this oil is yet named 'oli de cade.'

The origin of the word appears to have been derived

[1] *Forster.* The Disorders of Health, p. 153.
[2] *N. Webster.* Op. cit.
[3] *Paulet.* Op. cit., vol. i. p. 88. [4] Œuvres ed. Malgaigne, vol. iii. p. 423.
[5] Medicamentis Servandi Cadaveris Vini Obtinentibus.

from the facility with which the affection could be propagated *by the touch*, or contact. In this sense the term has been somewhat misapplied by the French, who have used it to signify the scabies, and also the *pourriture*, or 'rot,' of cattle and sheep.

Scheuchzer[1] mentions that the peasants of Lugano give this name to the disease known as glossanthrax.

A.D. 1517. 'Was a very droughty and frosty winter, a very hot summer, a very early and plentiful harvest. Wheat fell from ten shillings a bushel to ten pence. There was a great murrain of kine, so mortally infectious, that dogs and ravens feeding on their flesh were poisoned and swelled to death. None durst eat beef. In the beginning of this year (says Tyenius) raged a pain and inflammation of the throat, so pestiferous, malignant, and contagious, that whoever, within six or eight hours' seizure, had not proper remedies applied, died in sixteen or twenty hours.'[2] The epidemic sweating sickness began at midsummer this year.

A.D. 1518. In the city of Cascante, kingdom of Navarre, Spain, an epizoötic disease appeared among the horses, which consisted in a mass of abscesses about the head and throat, accompanied by insatiable thirst, hectic fever, and emaciation. Pedro Lopez of Zamora, chief veterinary surgeon of the kingdom, gave directions for its treatment, which were promptly successful.[3]

A.D. 1524. In Ireland, 'great inclemency of weather, and a mortality of cattle at the beginning of this year.'[4]

A.D. 1529. During the reign of the sweating sickness in mankind, the weather was most inclement all over Europe, and caused much alarm. Heavy rains had prevailed for a long time, the earth was soaked, and the air was laden with moisture. Deluges were frequent everywhere in Europe. In Brandenburg, in the preceding year, swarms of locusts appeared;[5] and in that country, as well as in the north of Germany generally, it was dangerous to eat fish, as it was reported that malignant and contagious diseases in mankind had been traced to this cause.[6] There

[1] Zungenkrebs, p. 4.
[2] *T. Short.* Op. cit., vol. i. p. 88.
[3] *Villalba.* Op. cit., vol. i. p. 135.
[4] Annals of Kilroonan.
[5] Annales Berlino-Marchici.
[6] *Leuthinger.* Scriptorum, p. 90.

was probably some plague and development of a peculiar poison in the finny tribes; pestilence in man and animals raging nearly everywhere. In various parts of the German states, the birds of the air became affected with disease. In the neighbourhood of Freyburg, in the Briesgau, for instance, they were found dead in great numbers scattered under the trees, with pustules as large as peas under their wings; indicating among them a disease that, in all likelihood, extended far beyond the southern districts of the Rhine.[1] Earthquakes were felt in Italy, and comets and meteors were frequent everywhere; blood-coloured rain fell at Cremona,[2] and disease prevailed among the porpoises in the Baltic. 'During Lent, to the astonishment of the inhabitants of Stettin, it was observed that porpoises came in great numbers up the frische Haff as far as the bridge, and that the Baltic cast on its shores many dead animals of this kind, which gave rise to the opinion that the waters of the sea were poisoned.'[3] Frightful famine in Germany and France. In Switzerland, an epizoöty among the cattle.[4] A great epizoöty among the pigs at Augsburg and Thuringia during the prevalence of the sweating sickness in mankind. Out of seventy attacked at Posangia, only ten were left. Six hundred died at Ceyca, and were thrown out of the city to be devoured by the wild beasts.[5]

A.D. 1530. During the pest at Milan, according to Ripamontius, after mankind had been seized with the disease, cattle were attacked.

A.D. 1534. Severe winter. 'Disease among pigs continued in Ceyca, and in the country around, to the great detriment of the poor people. Forty died in our own Monastery. The year, however, was healthy and fruitful.'[6]

A.D. 1539. In Ireland, 'fever and bloody fluxes being rife everywhere, whereof many died. An extreme hard winter followed, insomuch that store of cattle perished in many places.'[7]

[1] *I. Schiller.* De Peste Britanic. Commentary, fol. 3. 'The fowls of the air, with their delicate and irritable organs of respiration, feel the injurious influence much earlier and more sensitively than any of the unfeathered tribes, and have often been the harbingers of great danger, ere man was aware of its approach.'—*Hecker.*

[2] *Campo.* Pp. 150, 151. [3] *Klemzen.* P. 254.

[4] *Hans Stockars.* Heimfart von Jerusalem. 1839, p. 197. [5] *Mencken.* Op. cit.

[6] *Langius.* Chronic. Nurembergens. [7] *Ware.* Annals.

In England, 'in 1539, the thirty-first year of Henry VIII., was great death of burning agues and flixes; and such a drought that welles and small rivers were dryed up, and many cattle dyed for lacke of water; the salt water flowed above London bridge.'[1]

A.D. 1541-2. The summer of 1540 had been so excessively hot, that the woods often took fire spontaneously. At this time plague appeared in mankind in many parts of Europe, but especially at Constantinople. At Geneva, Textor observed that birds left their nests at the commencement of the plague, and Fallopius thought he had discovered a pestilential bubo on a bird. The following year, clouds of red locusts which came from the interior of Asia, through Turkey, passed over Sclavonia, Croatia, Austria, and Italy, and alighting in Spain destroyed all vegetation, and were the cause of much misery.[2] Kaye saw a cloud of them in Padua which extended as far as the eye could reach, and it was full two hours before they had passed. 'In September a large number of locusts were seen in this country, and especially around Leipsic, some with four, and others with six wings—the king was about the size of a sparrow. Wherever they came they devoured every leaf, herb, and grass, and besmeared everything with a red blood-coloured substance. In the day-time they travelled almost a mile (five English miles) without resting; when they settled anywhere, or were blown down by the wind, they lay a foot deep, and created a dreadful stench.'[3]

A.D. 1543. 'By reason of a great mortality among the cattle, occasioned by great rains in the preceding season, meat rose to such an excessive price that mutton was sold at two shillings and fourpence the quarter, and a lamb at three shillings and fourpence. The consideration whereof induced the Lord Mayor and Common Council to make a sumptuary law, for preventing luxurious eating; whereby the Mayor was restrained from having more than seven dishes at either dinner or supper, and the Aldermen and Sheriffs to six, upon the penalty of forty

[1] *Stow.* Annals.
[2] *Villalba.* Op. cit. *Lupercio Fanzano.* Annales de Aragon.
[3] *Vogels.* Annal. Leipzig, p. 151.

shillings for every supernumery dish; the sword-bearer to have four, and the mayor and sheriff's officers three dishes.'[1]

A.D. 1544. In Peru, the wild and domesticated alpacas died in great numbers from a cutaneous disease.[2] This malady has been observed to destroy these animals in modern times, when they have been transferred from high to low countries.

A.D. 1552. The previous year had been remarkable for very unusual weather, the atmosphere being heavily charged with water, and various electrical phenoména were manifested. Mould spots, or *signacula*, were observed on clothes in Germany, the water was affected by red discolourations, and there was an exuberance of the lowest cryptogamic species of vegetation. Anthrax appeared among cattle at Lucca in Italy. 'When, however, the farmers had considered the nature of the malady, they immediately slew any cattle that were affected. In this disease it was worthy of notice, that if the blood of any of the infected animals came in contact with the bare skin of a man it produced carbuncles, which, if not opened, were harmless—a wonderful circumstance; but if opened, and not immediately cauterized, they would rapidly spread, and be the cause of speedy death. The flesh of the slaughtered and diseased cattle was cooked and eaten, and yet caused no inconvenience, but broth made from it proved fatal to whomsoever partook of it.'[3]

A.D. 1556. An epizoöty following a blight of the crops in the cantons of Berne and Basle, in Switzerland.[4] In all probability this was anthrax.

A.D. 1559. 'In this month (July) there occurred a remarkable circumstance: several wolves came in open day from the woods near Horla and Wolffsberg, and hunted cattle and people; they destroyed several cattle. In the circle of Magdeburg, there arose, in certain parts, a contagion and mortality among cattle.'[5]

A.D. 1567. Small-pox raging in the human species in many countries. For the first time, for certain, according to some

[1] *Maitland.* History of London, 1739, p. 141. *Holinshed.* Op. cit.
[2] *Garcilasso.* Historia General del Peru, 1722.
[3] *Wierus.* De Præstig. dæmon., lib. iv. chap. 30.
[4] *Urstis.* Chronic. Basil., vol. viii. p. 22.
[5] *Spangenberg.* Op. cit., 479.

authors (but erroneously, as I have shown), there is mention made of the small-pox in sheep. Joubert, a physician, in alluding to the plague in man, thus notices the disease: 'Neither do those people think wrongly, in my opinion, who argue that the corpses of men who die by the plague are more hurtful to man than those of horses are to horses, and of other animals to animals of their own species. Sometimes, nevertheless, it happens, as Ficinus relates, that the plague passes from men to pigs, not on account of any similarity in their dispositions, but in their flesh. The people of Montpellier commonly call the pest in sheep *picota* ('picotte,' the French term for *variola ovina*): *Monspelienses pestem pecoribus familiarem, Piccottam appellant.* If we may believe Arnoldus Villanovanus, the plague of man never attacks sheep, and that of sheep never attacks man. In previous years, as I hear, a certain pest attacked the cats alone in Lutetia, Parrhisii, and carried off an innumerable quantity.'[1]

'After Lent there came a great mortality among the sheep, so that several thousand in my neighbourhood alone died, and the same occurred in other parts.'[2]

A.D. 1571. An epizoöty among cattle, and an epidemy in mankind at Memmingen.[3]

A.D. 1572. In Ireland 'there was a great mortality of men and cattle in this year.'[4]

A.D. 1578. Epizoötic disease among cats and poultry at Paris.[5]

A.D. 1580-1. Influenza in man, as well as malignant fever and small-pox, raged over Europe. According to Riverius, a prodigious plague of insects appeared in April and May, immediately before the breaking out of the influenza. They were supposed to rise out of the earth; and so dense a multitude were they, that the daylight was obscured by them, and they were crushed by millions on the roads.[6] The air seems to have been tainted to a strange degree, for birds felt its evil influence, and abandoned

[1] *Joubert.* De Peste Libellus. Lugd. 1567. See the year 1277.
[2] *Spangenberg.* Op. cit., p. 489.
[3] *Erhardt.* Topography of Memmingen, p. 63.
[4] Annals of the Four Masters.
[5] *Paulet.* Vol. i. p. 56.
[6] *Riverius.* Opera Omnia Medica. Lugd. 1669, p. 585.

the countries in which the epidemic appeared. The birds of passage migrated before their appointed time, and those whose nature it is to build on trees and in elevated situations rested during the night on the ground. Not only did this occur, but animals which fed on herbs and leaves became sickened with their usual food, which seemed to be polluted by some virus in the atmosphere.[1]

In 1581, says Dr Short, 'at six o'clock in the evening, in April, was an earthquake not far from York, which in some places shook the stones out of the buildings, and made the church bells jingle; the next night the earth trembled once or twice in Kent, as it did also May the 1st following. November the 1st, in Kent and the marshes of Essex, was a sore plague of strange mice suddenly covering the earth, and gnawing the grass roots; this poisoned all field herbage, for it raised the plague of murrain among cattle grazing on it. No wit or art of man could destroy these mice, till another strange flight of owls came, and killed them all. A great earthquake in Peru.'[2]

[1] *Salius Diversus.* De Febre Pestilente. Francof. 1586, p. 62.

[2] *T. Short.* Op. cit., vol. i. p. 267. *Stow.* Annals. 'This very unusual irruption of mice in Kent and the marshes of Essex appears to have caused some dismay; and well it might, for the occurrence must have been as perplexing as it was unusual. In other countries, however, this is not so, and the mice or rats, or some cognate species, are noted for their migratory habits; though perhaps all do not give rise to a 'plague of murrain,' whatever that may have been. Some notices of these appear in this 'History;' a few others are mentioned as follows. Wrangell, when travelling in the far north of Siberia, speaks of the misfortunes of a native hunter. 'He had expected that his dogs would have been able to subsist during the summer on the mice, which they are in the habit of catching, and had brought with him only as much food for them as he calculated he should require for them on his return. Unfortunately the mice had migrated, and in consequence the greater part of his dogs died.' 'The mice often emigrate in large numbers from one island to another, and sometimes even to the continent of Asia.'—*Travels in the North of Siberia*, pp. 497, 498.

Tschudi, for Peru, says: 'Numbers of the mouse family, from the small tree mouse (*Drymomys parvulus*) to the large, loathsome, spinous rat (*Echinomys leptosoma*), swarm over all the Montañas, and love to approximate to the dwellings of man. These animals destroy the gathered harvest, and even in these remote regions they become a plague.'—*Travels in Peru*, p. 424.

A species of marmot (*Lagopus Tibetanus*, Hodgson: the 'Kardiepien' of the Tibetans) sometimes migrates in swarms, like the Lapland lemming, from Tibet, as far as Tungu.—*Hooker.* Himalayan Journals, vol. ii. p. 93.

The ermine also, according to Brooke (*Travels in Norway*, p. 310), Pontoppi-

A.D. 1586. According to Forster, there was an epizoöty of rabies among dogs during the epidemic plague in Flanders, Turkey, Hungary, and Austria.[1] It may be this epizoöty to which Dr Short refers in 1587, when he says: 'The Belgians groaned under a terrible plague and famine; for the inhabitants of great towns and villages in Flanders were either slain in war, dead of the plague, or starved with hunger. All the country was waste, so as wolves and wild beasts stabled in the houses; they were become so numerous, that they killed and tore in pieces, not only cattle, but men, women, and children. Dogs, with hunger and madness, run up and down the country, biting and killing cattle and one another.'[2]

dan (*Natural History of Norway*), and Pennant (*Arctic Zoology*), emigrates in immense numbers. But the most curious and notable of all creatures for this propensity is the lemming. Olaus Magnus believed them to be poisonous in their action on vegetation. He says: 'In the aforesaid Helsingia, and provinces that are near to it, in the diocese of Upsal, small beasts with four feet, that they call lemmar, or lemmus, as big as a rat, with a skin diverse coloured, fall out of the ayr, in tempests and sudden showers; but no man knows from whence they come; whether from the remoter islands, and are brought thither by the wind, or else they breed of feculent matter in the clouds: yet this is proved, that as soon as they fall down there is found green grass in their bellies, not yet digested. These, like locusts, falling in great swarms, destroy all green things, and all dyes they bite on, by the venome of them. This swarm lives so long as they feed on no new grass. Also they come together in troops like swallows, that are ready to fly away; but at the set time they either die in heaps with a contagion of the earth (by the corruption of them, the ayr grows pestilentiall, and the people are troubled with vertigos, or the jaundice), or they are devoured by beasts, commonly called lekat, or hermelin, and these ermines grow fat thereby, and their skins grow larger.'—*History of Goths and Vandals.*

Lloyd has the following: 'We are informed by M. Malin, the naturalist, who spent some time in Lapland, that in the summer and autumn, when the lemmings traverse the forest and the 'fjälls,' they are pursued, killed, and eaten by the reindeer when pasturing.—*Scandinavian Adventures*, vol. ii. p. 74.

The 'Old Bushmen' thus speaks of the sea-gulls of Lapland: 'Although occasionally seen accidentally in other parts of Scandinavia, the peculiar breeding home of the Buffons Skua (a variety of gull) is on the Lapland fells. They are not always seen in the same numbers every year, and they say that it is the lemmings which draw them down to certain localities. One thing, however, is certain, that in 1862 we had a migration of lemmings at Quickiock, and that year in one fell meadow, a little distance from the village, I shot about twenty-five old birds, and procured above thirty eggs.'—*Ten Years in Sweden*, p. 401.

[1] *Foster.* Op. cit., p. 156.

[2] *T. Short.* Op. cit., p. 271. It is somewhat remarkable, that, until this date, we should have no exact record of any epizoöties of rabies in the dog. The

A.D. 1590. Rabies in wolves was epizoötic at Montbelliard.[1]

A.D. 1591. In Sicily, an epidemy and epizoöty during a hot and damp year. 'In this year there was a good deal of blight, which the people called *resin* (*uredo, rubigove, quam vulgus resinam appellat*), on the trees, plants, corn, and everything green; and, miserable to relate, it destroyed all these in a very short space of time. Cows, sheep, and all herds, on account of the blighted and bad quality of the forage, became emaciated, as if the blight had been of a deadly nature to them, as well as to the vegetation. All milk was foul and of a pale colour, and all the corn, pulse, and barley was light, mildewed (*æruginata*), and had a bad and corrupt smell, from the constant rains, when collected by the farmers.'[2]

A.D. 1592. Mortality among the fish at Leipsic.[3] In England was an excessive drought, and great death of cattle from want of water. Springs and brooks were dried up; horsemen could ride across the Thames at London.[4] The following winter was so severe at Vienna, that the wolves entered the town and attacked men and cattle.

A.D. 1598. After inundations and heavy fogs, there was a general epizoöty among cattle in Germany.[5] In the same year there appeared ergotism in the human species.

disease was known from the very earliest times, for Homer appears to allude to it in the Iliad.

> 'Not half so dreadful rises to the sight,
> Thro' the thick gloom of some tempestuous night,
> Orion's dog (the year when Autumn weighs),
> And o'er the feebler stars exerts his rays;
> Terrific glory! for his burning breath
> Taints the red air with fevers, plagues, and death.'

Hippocrates, Aristotle, and Dioscorides describe it, and it was well known to the Greek and Latin writers of a later age. And yet until the present century I have been unable to trace its existence in an epizoötic form. We have noted its occurrence in other animals, but not in the dog; though in the early ages of our era it must have been very prevalent, for we find that in Belgium, at a remote date, pilgrimages used to be made to the shrine of St Hubert, as they now are, for the cure of hydrophobia. *Dudley Costello.* The Valley of the Meuse, p. 297.

[1] *J. Bauhin.* Memorab. Historia Luporum, &c. Montbelliard, 1591.

[2] *Marcellus Capra.* De Morbo Pandemonio, fol. 2.

[3] *Vogels.* Annal., p. 268.

[4] *T. Short.* Op. cit., p. 274.

[5] *Ampsingii.* De Medic. et Astron. Conjugio. Rostok, 1629, p. 206.

A.D. 1599. Plague in mankind in various parts of the world, but especially in France and Upper Italy. To this was added, in Italy, disease in cattle, which destroyed more than thirteen thousand beasts.[1] 'There is a certain manuscript, which is worthy of credence, in which Antonius Faccius says, that in the ninety-ninth year of that age in which Fracastorius lived, so grievous a plague attacked the oxen, that the Senate was bound to issue edicts to the public, to the effect that no flesh of oxen, no cheese lately made, no butter, nor yet milk, should be sold in the State under pain of death; but that mutton alone should be eaten.'[2] 'A plague among *cattle and goats* in Italy, and by them communicated to other animals.'[3]

An epidemic of dysentery in Venice and Padua was the cause of the above order, which gave rise to a great contention between the inhabitants and the butchers. The disease among the cattle was supposed to have been imported from Hungary. It may here be remarked, that the cities of Venice and Padua had, from time immemorial, drawn their supplies of cattle from Hungary and Dalmatia, and so severely and frequently did they suffer from epizoötic diseases, that at a later period they were compelled to renounce this source of supply. Wirth, however, as usual, classes the disease amongst the animals as one of an anthracoid character.[4]

A.D. 1603. Very inclement season in London, and a pestilence among mankind which was supposed to have been introduced from the Low Countries. A famine prevailed, and extensive disease amongst all animals, but particularly cattle. Even dogs suffered greatly.

A.D. 1604. In October great floods in England and Wales, which destroyed cattle and everything else in the marshy country. Rabies canina was epizoötic in Paris, and caused great alarm.[5]

A.D. 1609. A plague in Memmingen from July to December, killing a number of people. From December, an epizoöty

[1] *Palladio.* Storia de Friuli, vol. ii. p. 235.
[2] *Ramazzini.* De Contag. Epid. Boum, Opp. Genev. p. 794.
[3] *Cole.* Quoted by Dr Short, p. 287.
[4] Op. cit., p. 85.
[5] Journal de Henri IV., vol. iii. p. 221.

in cattle, which was so fatal that all attacked died.[1] 'Was a most rigorous hard frost from December to April; the Thames became a highway; birds and garden stuff were killed.'[2]

A.D. 1610. Plague showed itself in the suburbs of Grenada, and spread rapidly. Spain and Constantinople suffered very much from pestilence. The same epizoöty as in the preceding year became more general, and at the same time a malignant epizoöty reigned in Alsace, which did not even allow untamed birds to escape; these were often seen falling to the ground dead.[3]

Gangrenous sore-throat declared itself in Old Castile this year among the horses, cattle, and hogs; it destroyed entire herds.[4] Catarrh prevailed in mankind throughout Europe. 'As in the previous year, the trees suffered much from cold, so in this year the bark and leaves were eaten by vermin, so that there was no fruit; on the contrary, there was much wine. Among the cattle there raged a contagious disease in the mouth, so that many died.'[5] Was this the same disease that reigned in Memmingen, Alsace, and Spain? And was it anthrax (affecting the mouth and throat), influenza, or ekzema, or all three?

During the plague in mankind at Constantinople, there was a dreadful visitation of locusts. 'Such clouds, or swarms, of grasshoppers so plagued the city and country about Constantinople that they darkened the sun, and left not any green herb or leaf in all the country; they entered the bed-chambers; they were near as large as dormice, with red wings.'[6]

A.D. 1612. An epidemy in Hesse and other parts of Germany, followed by a great pestilence among pigs and cattle, according to Gœlenius. Previous to this a sudden and amazing number of spiders appeared, and swarms of locusts swept Provence.

A.D. 1613. Plague in man still raged at Constantinople. The cats were transported to Scutari, under a supposition that they were the cause of the plague, being themselves distempered.[7]

[1] *Erhart.* Op. cit, p. 63.
[2] *Clark's* Examples. *T. Short.* Op. cit., vol. i. p. 292.
[3] *Lebenswald.* Landstadt-und Haus-arzneibuch. Nuremberg, 1695.
[4] *Fontecha.* De Anginis Disput. Compent., 1611.
[5] *Walser.* Appenzeller Chronik., p. 581.
[6] *T. Short.* Op. cit., p. 294. Turkish History.
[7] *Forster.* Op. cit., p. 157. *T. Short, Mignot.*

A.D. 1614. A very deadly epidemy, and an epizoötic disease among the fowls in Bohemia.[1] The fowls collected in groups of six or seven, according to Schottky, and holding their heads close together, would fall to the ground and die. A great snow-storm in the west of England. The snow lay very deep, and for a long time, and destroyed much cattle and sheep.

A.D. 1615. Epizoöty among the horses in the canton of Appenzell.[2]

A.D. 1616. Malignant angina appeared in the human species at Naples. Plague appeared in Egypt, Norway, Denmark, Bergen, the Levant, and other places. 'In consequence of an epizoöty, the character and results of which, as well as the source, were unknown, and which manifested itself with great severity in the provinces of Padua, Treviso, Vicenza, and Udine, the sale of the flesh of bullocks and calves was strictly prohibited until the month of August. The slaughter of calves was interdicted until the end of September. These orders were in force throughout the Venetian dominions, as far as the Mincio.'[3]

A.D. 1617. Mercurialis plainly indicates that the epizoöty reigning at Venice, where it was named *giandussa*, was *angina maligna*, a form of anthrax which was even transmissible to man. 'On account of the daily rains the herbage on the plains became covered with mud, and the cattle eating this, were seized with putridity of the throat, became suffocated, and died. Some, when half dead, were killed to be eaten, and the herdsmen and farmers, fearing no such evil, quickly succumbed to the noxious food. The calamity affected all proprietors to a like extent.'[4]

The same disease appeared in the kingdom of Naples; and, indeed, from what one can gather, there is every probability that since 1609 this malady has held sway in the greater part of Europe among cattle. 'In this year a great slaughter of cattle happened everywhere from the *ignea pestis* (anthrax), so that they could not masticate their food, far less swallow it; wherefore very many perished by a most miserable death, as I see remarked in some manuscript chronicles.'[5] 'In 1618, a disease

[1] *Walser.* Op. cit. [2] Ibid. [3] *Bottani.* Op. cit., vol. ii. p. 34.
[4] *Ath. Kircheri.* Scrutinium Physico-Med. Pestis. Rome, 1658, p. 60.
[5] *G. Outhovii.* Judicia Jehovæ. Groningen, 1721, p. 740.

among the oxen happened in our country, by which they fell down choked in a wonderful manner. Spain was the first place which felt the full force of this malady. Afterwards Malta, Sicily, Sardinia, Hydruntum, Apulia, Calabria, Latium, and at length the whole of the Neapolitan province was affected; to which, after two and twenty years, it had become so domiciled, that many thought it would be some centuries before it entirely disappeared.'[1] From its becoming endemic, it was designated the '*boum annua lues.*'

The garrotillo, or quinsy, was about this period committing great havoc in man, especially in Naples, where it was also named the *male in canna.* It may be mentioned here, that in the winter of this year a terrific snow-storm happened in England, which continued for thirteen days and nights, causing the loss of 20,000 sheep in one district alone,—that of Eskdale Moor.

A.D. 1625. Inundations, destroying cattle and horses at Seville and Salamanca. On the authority of the archives of the Agricultural Society of Southern Russia, the Cattle Plague broke out in Hungary, passing thence into Italy, where it appears to have raged for some time, as it is mentioned for subsequent years.

A.D. 1628. In the states of Venice, *Rot* (*pourriture, biatta, marciume*) amongst sheep.[2]

A.D. 1630. Famine in Italy the two preceding years. In this year great inundations, and disease of plants, and famine in Germany, lasting during 1631. An epidemy in man, and a *bovine pest* in the whole of Upper Italy.[3] Wirth, erroneously, I think, mentions *anthrax* as prevalent in Italy. It was far more likely to be the Cattle Plague, which had prevailed since 1625; in which year he also mentions it as present in that country. At Padua an epizoöty among cats.[4]

A.D. 1635. Plague in mankind at Nimeguen, during which, Diemerbroek says, 'about twenty hens, which were raking

[1] *Severinus.* De Recondita Abscess. Nat. pp. 431—446.
[2] *Bottani.* Vol. ii. p. 37.
[3] Ibid. p. 43. *Ramazzini.* De Contagiosâ Epidemiâ.
[4] *Muratori.* Govern. della Peste, p. 8.

into some of the nastiness thrown out of an infected house in the time of the plague at Nimeguen, contracted the distemper and died. Some of them had the pathognomonic signs of the plague.' He also mentions that before the plague broke out, birds which were kept in cages died in many houses where the disease afterwards appeared.[1]

A.D. 1638. Cattle epizoöty in Friuli.[2]

A.D. 1640. 'The unforeseen uprising of the Portuguese in 1640, amongst other evils, was the cause of a cruel epizoöty of contagious scrofulous tumours (*lamparones contagiosas*) among the horses, the result of a skirmish between the Spanish and Portuguese cavalry, and taking the captured horses to Badajoz; so that, according to Martin Arredondo, there died more than 500 horses, which no remedies could save.'[3] This was in all probability an epizoöty of glanders and farcy. An epizoöty appeared among the cattle of the Jura Alps, which caused great devastation among the herds and alarm to the people. During the panic, a poor woman, Catherine Miget, was put to the torture and publicly burnt, as it was believed she had bewitched the fountains of Sancy (Franche Comté) and the herds of the district.

A.D. 1643. A bovine pest in Saxony. Weck says: 'A cattle contagion, the so-called flying pestilence (*flissende pest*) appeared, of which many thousand head of cattle died, and for which but one single remedy was found efficacious, namely: if the infected animals were placed among horses, these took the infection, and the cattle recovered.'[4]

A.D. 1648. An epizoöty among the horses of the French army in Germany. Solleysel, a celebrated French veterinarian and author, has given us a description of it. It began by fever, great prostration, and tears running from the eyes, and there was an abundant mucous discharge of a greenish colour from the nostrils. The horses also experienced loss of appetite, and their ears were cold. Few of those attacked recovered. The treatment adopted was with a view to neutralize the malignity

[1] *Diemerbroek.* De Peste.
[2] *Bottani.* Vol. ii. p. 45.
[3] *Villalba.* Epid. Español. vol. ii. p. 69.
[4] *Meyer.* Topography of Dresden, p. 276.

of the poison and to fortify nature; 'for it was a poison,' says this writer, 'which gave rise to the disorder and was the cause of the fever. Remedies, at the commencement of the epizoöty, were of no avail. Precautions were taken to have all the healthy horses removed from the infected stables, and they were not to return to them until they had been fumigated, whitewashed, and otherwise cleansed.'[1] Solleysel designated it a 'fièvre pestilentielle,' very deadly at its commencement, but afterwards amenable to medical treatment. It was evidently 'influenza.' A catarrhal fever had been epidemic the previous year.

A.D. 1649. Small-pox in sheep in Padua.[2] Epidemic small-pox raging in mankind in Boston, U.S. Plague in Spain and France.

A.D. 1650. A volcanic eruption in the Gulf of Santorin. The accompanying evolution of sulphur and hydrogen issuing from the sea killed more than fifty persons, and more than one thousand domestic animals.[3] Ergotism in man, especially in Sologne. Pestilence in Russia and Poland. Myriads of locusts were seen to enter Russia in three different directions, and soon after they spread over Poland and Lithuania in such swarms that air and earth was obscured by them. So numerous were they, that in many places they lay heaped to a depth of four feet, and the very trees bent with their weight. They caused a fearful amount of damage. *Epidemic* influenza all over Europe.

A.D. 1655. A disease among fish in the lakes and ponds, according to the Chronicle of Godfrey. People who had gathered the dead and dying creatures and had eaten them, were attacked by a pestilential disease which killed a very great number; even the dogs which ate the unburied dead were attacked by madness.[4]

A.D. 1656. Pestilence in man in the Neapolitan territories and the Ecclesiastical States, which caused an immense loss of life. An epizoötic disease appears to have reigned at the same time. It is noted: 'With regard to the human pestilence which

[1] *Solleysel.* Parfait Maréchal. Paris, 1684, p. 404. [2] *Bottani.* P. 46.
[3] *Lyell.* Principles of Geology, p. 443.
[4] *Gothofred.* Chronic.

invaded the city of Rieti and other cities of the Ecclesiastical States, it is certain that these places received the contagion more than once, from those who were employed in the hospitals conveying it when they passed into the houses of the healthy. But the animals seem to propagate their pestilence among each other without being brought into actual contact.'[1]

'At the same time (as the plague in man), a cruel epizoötic disease aggravated the pestilence by attacking and destroying the greater part of the oxen and sheep.'[2] A strange epizoöty was observed to affect the pelicans in the West Indies. So mortal was the disease, that their dead bodies covered many islands. 'In the year 1656, and in the month of September, there was a great mortality among these birds, particularly the young ones; for all the shores of the islands of St Alousie, St Vincent, Becoüya, and all the Grenadins, were covered with the bodies of these dead birds.'[3]

A.D. 1659. Either the same or another epizoötic disease appears to have prevailed in Italy in this year, for we find that the Senate of Venice was obliged to issue an order relative to the use of the flesh of diseased cattle. 'Joint notice was given to the villages of Tessera, Campalto, and San Martino—communes under the magistracy of Mestre, that all diseased cattle were to be killed; and in order, for the protection of human life, that their flesh might not be sold as food, they were to be buried or publicly destroyed. This law was published in these villages.'[4]

A.D. 1661. In England, Pepys writes on the 21st of January: 'It is strange what weather we have had all this winter. No cold at all; but the ways are dusty, the flyes fly up and down, and the rose-bushes are full of leaves, such a time of the year as was never known in this world before here.'[5] 'This dry, hot summer drove many animals to frenzy and to madness, by which farmers experienced much loss. It was remarked that horses, oxen, and sheep were first attacked with symptoms of

[1] *Colantonj Ragguaglio.* Delle Peste Scoperta in Rieti. Rome, 1658.
[2] *Frari.* Vol. ii. p. 484.
[3] *Dutertre.* Hist. Generale des Antilles. Paris, 1567, vol. ii. p. 273.
[4] *Bottani.* Vol. ii. p. 49.
[5] *Samuel Pepys.* Diary and Correspondence.

phrenitis and vertigo. The herdsmen noticed that there were worms in the heads of the affected animals.'[1]

A.D. 1663. The year 1662 was remarkable for a great drought in England, but the subsequent years were wet and unhealthy, not only in Europe, but also in North America, where plants and animals were alike diseased. Rot in sheep was particularly observed in England, Germany, and other countries, and even wild animals were said to suffer from this affection. In Germany, 'one owner, who had originally in his flocks 3000 sheep, now had scarcely 40 left. This disease was commonly termed *egeln, egelichte, lebern*. . . . . Amongst wild beasts, stags and hares were the first in that year which, chiefly in the district of Rodacum, were either found dead, or so deprived of strength as to become an easy prey to the hunters. . . . . The bodies of the dead creatures, when examined, exhibited the liver and lungs in a putrid state. The livers of stags were full of hydatids (*vermium*). Among domestic animals, the plague committed the greatest ravages in sheep and young cattle. The sheep, without any distinction as to age, were affected; and, moreover, the animals *in utero* were found to have the same diseased appearances.'[2] The causes were alleged to have been frequent inundations, the honey-dew and rust of herbage, and corrupt water. The disease continued in the two following years.

'The whole Venetian territories were seized this year with a malignant epidemic, which infected 60,000 people. They began with horror and a fever: some died quickly, the rest recovered. It proceeded from monstrous and incredible numbers of small worms.[3] This year and the following, the livers of all sheep, oxen, deer, hares, &c., were only bags of worms, like leeches, and often the lungs also. Out of 3000 sheep not 40 were left alive. Only old bullocks and sheep escaped, for all the young and middle-aged died of this plague. Even the livers of young *in utero* were eaten up with this vermin. Some farmers ascribed it to the cattle eating *numularia*, which is very unlikely, both

[1] *Thomas Bartolini.* Epist. Med. Cent., iii. Ep. 48. Hafn. 1667.
[2] *Frohmann.* Miscell. Nat. Cur., p. 245. [3] *Bonet. T. Short.* Op. cit., p. 338.

since it is a restringent (astringent), and that it grows and is eaten every year as well as this.[1] To some great sheep-masters this makes one of their epochs still, and is called the "Rotten Year," most of all their great flocks of sheep dying then. In '63 was a great death of cattle in England from a most severely rainy wet autumn. Their carcases were sold at very small prices among ordinary people.'[2]

Schnurrer writes: 'The year 1663 was a very damp one in England, so that the sheep and cattle suffered severely from fluke-worms (*Egelwürmern*).'[3]

A.D. 1664. Small-pox in sheep in Venice.[4] 'During the summer a comet was observed, and a malignant epidemy is described, which soon after developed itself as the Great Plague of London. The signs said to foreshadow this plague were many, but the principal were the birds and wild beasts having left their accustomed haunts, and the almost total absence of swallows; swarms of flies everywhere, ants in masses, and the ditches filled with frogs and insects.

A.D. 1669. 'This year was remarkable in consequence of the unusual drought and heat of the summer. From May till Martinmas scarcely any rain fell. There arose a great scarcity of water, especially upon the Alps. The cattle disease (*viehprèsten*) raged rather dangerously, and with mankind there appeared dysentery.'[5] 'After honey-dew (*honigthau*) in plants, a great cattle disease followed.'[6] 'July 31st, was seen a great dark cloud rise in the east near Litchfield, which coming near the city, was over it about noon, and was a prodigious swarm of ant-flies, so thick that they darkened the sky. They then fell down, filled the houses, stung many people, put all the horses mad, and market people were forced to pack up and be gone, and the people at harvest-work were driven home. Thus they continued for three hours, covered and laid thick on the streets; many of them were dead, and were sweeped together in great

[1] *Bonet.* Sepulcr. Anatomic.
[2] *Hodges. T. Short.* Loc. cit.
[3] *Schnurrer.* Chronik der Seuchen.
[4] *Bottani.* Vol. ii. p. 134.
[5] *Trumpy.* Glarner Chronik, p. 377.
[6] *Scheuchzer.* Oryctoga Helvetic., p. 20.

heaps; the remainder took their flight northward and molested other places.[1]

A.D. 1671-2. An extensive exanthematous epizoöty among cats in Westphalia. 'The head was covered with scabies, and at first the ears were inwardly crusted with scaly matter. The eyes seemed as if they were covered with a film, although the animals could see until suppuration took place; after this period they died. Sleep continually oppressed them; and so drowsy were they, that they appeared as if they had heard that celebrated speech on the joys of sleep after dinner. The skin disease did not proceed further than the head and neck. There was scarcely a house in which some were not infected; and unless common rumour be false, it seemed that it could be communicated from one to another, as well as generated spontaneously. As a proof of this, it attacked some which were closely shut up, so that they might be free from all contagion from the diseased. Some are supposed to have been cured by the fat of a whale; in the case of most, however, medicine was of no avail, and few survived.'[2] In this year small-pox again appeared amongst sheep in the Venetian states.[3]

A.D. 1674. Small-pox in sheep again in the Venetian territory. In Seeland, the largest of the Danish islands, 'rot' in sheep, and the customary fluke (*distoma hepatica*) found not only in the livers of these animals, but in those of other domesticated and wild creatures. Willius gives the following observations: 'All the race of oxen sickened. A languor seized their whole body, their breathing was short and rapid; they had a frequent hacking cough. They ate as usual, bred, and grew fat. The fatness was in every part of the body most extraordinary, but the flesh was very flaccid. The lungs were filled with innumerable hydatid cysts, some of which were the size of two fists. On the exterior of the lungs of one cow I reckoned seventeen, but they lay so thick within, that they would not admit of being counted. The whole of the thorax was filled with reddish serum; the vessels of the heart were enveloped in copious fat; in the pericardium a liquid, similar to that observed in the chest, was

[1] *Clark.* Examples. *T. Short.* P. 353.
[2] *Wedlius.* Miscel. Nat. Curios., Dec. I. [3] *Bottani.* Loc. cit.

found; and the muscular fibres of the heart, when exposed, were seen to be soft and wasted. The liver, however, in all of them, was most affected. In many cows it was full of watery tumours, varying in size from a fist, an apple, a walnut, or a hazel nut. In some cases there was a large tumour in which a few of the lesser ones were included. The livers of some oxen were free from hydatid cysts, but they were everywhere scirrhous. The gall bladder was very much increased in size, and full of peculiar fluid which was pale in colour, and flowed like water. Not only in nearly all the branches of the vena portæ, but also in the biliary ducts, many worms were found (like *distoma*). . . . I also remember that in this year I found some dead hares in the month of spring in the country, and their hearts were flaccid, while their livers were dotted here and there with black spots.'[1]

A.D. 1679. Great epidemy in Andalusia, but more severely at Vienna. The summer hot and damp. Mushrooms were very plentiful, according to Sorbait. Cats and birds died in Vienna during the plague. In Hungary, diseases of a carbuncular nature appeared. The following account may be interesting. 'In the little town of Czierko (in Hungary), in the summer of 1679, a certain winged insect, unknown to all, appeared, and mortally wounded both man and beast with its sting, causing great mortality among them. For instance, in this one little township, thirty-five men, and a great number of oxen and horses, were killed by them. No one was proof against their attack, and they fixed their stings on any part not covered by a garment, namely, the face, the neck (and in this spot the Poles particularly suffered, on account of their habit of cutting their hair), the hands, or any other part of the naked flesh. A hard tumour soon formed on the part stung, and unless the wounds were immediately attended to in the first three hours, and the poison extracted by scarification, or some other like means, all after-treatment was unavailing, and the sufferers died within a few days. This species of insect was unknown in these parts, and had never before been seen by any one. Many people were persuaded that it was sent by God for a punishment; and it seems evident that it was the work of a deity, because they confined themselves within

[1] *Willius.* Acta Havniens. 1674, p. 132, obs. 76.

the borders of Czierko, and leaving the Germans alone, had sought only the Poles. At the end of September, however, a violent wind drove these insects to us, but on account of the extreme cold, we did not suffer an equal amount of loss, for except one ox and two horses which they killed, only one person was stung, who, however, recovered.'[1] This was written on the confines of Silesia and Poland.

A.D. 1680. A cold winter and heavy storms in the spring-time and summer. Invasion of locusts. 'Some annals attest, and the following history certifies, that an epidemic disease in fish is a most sure prognostication of a future plague. Before the last attack of the plague, in the year 1680, fish in the fresh water lake of Mansfeldi, and, in a less degree, in the salt lake of Langenbogia, perished in great numbers from some epidemic disease. They had spots of various colours—black, red, yellow, and green—dotted here and there over their bodies. They exhaled a foul odour and had a nauseous taste; and from eating them, people of the poorer class suffered great pains in the chest, intense prostration of body, nausea, vomiting, and foul and malignant fevers. The medical men at Halle, Islebie, and some other places, after carefully examining this wonderful phenomenon, all attributed it to one cause,—namely, the foul nebulæ which pervaded the water at that time; for these nebulæ were so corrosive, that the faces of men fishing in the lakes became ulcerated. The surface of the water was covered with a greenish scum.'[2]

A.D. 1682. Damp summer and inundations. An eruption of Vesuvius; the city of Catania destroyed by an earthquake; an eruption of Mount Etna, destroying 60,000 people. A comet was seen, and fogs or mists of a blue colour and sulphureous odour, which destroyed the forage, and extended from Italy to England, were spoken of. In this year there was a great epizoöty of glossanthrax, or carbuncle of the tongue, which seemed to spread from west to east, through Switzerland, France, Germany, and Poland. A witness to its ravages in Holland, to which country it had at last found its way, in the month of

[1] *Stegmann.* Ephem. Nat. Curios., vol. ii. p. 427.
[2] Ibid. Dec., vol. ii. p. 386.

May, thus describes it: 'I am able to bear witness, that, in the year 1682, the *ignea pestilentia* raged among the cattle in the country of Groningen, for in that year I happened to be living there; and it was said that this deadly fire was first kindled in Italy. Then it crept into Burgundy, and spread over the whole of Switzerland, Germany, and Brabant, and in its course, in the month of May, it attacked the cattle in the district of Groningen, where it continued up to the end of the year; and if I am not deceived, in the following year it held its course as far as Friesland. The disease was a fiery burning, and the cattle suffered from inflamed pustules on the tongue, and not until great havoc had been created was any remedy found. The following treatment proved effective. Sharp and jagged silver instruments were used to scrape the tongues of the sick animals until they were raw and bleeding. In this way art overcame disease.'[1] Dr Wincler, chief physician to the Prince Palatine, and who wrote from the Rhine in December, 1682, to his friend Dr Slare, gives a very lucid account of its commencement and progress. 'In 1682, on the borders of Italy, a murrain infected the cattle, which spread into Switzerland, the territories of Wurtemburg, and other provinces, making great destruction among the cattle. The contagion seemed to propagate itself in the form of a blue mist,[2] which fell upon those

[1] *Outhovii.* Judicia Jehovæ. Groningen, 1721, p. 740.

[2] The influence of a 'mist' in the production of disease, either in the animal or vegetable kingdoms, has, from the earliest times, been looked upon as a certainty. This history of epizoöties will testify to some of these instances, in relation to the plagues of the lower animals, but more numerous examples will perhaps be found in the narratives of epidemic invasions. We constantly read in the ancient records of atmospherical perturbations either preceding or accompanying severe pestilential visitations. 'On the island of Cyprus, before the earthquake, a pestiferous wind spread so poisonous an odour, that many, being overpowered by it, fell down suddenly and expired in dreadful agonies. A thick stinking mist advanced from the east, and spread itself over Italy.' This was previous to the Black Death, and Hecker remarks that the German accounts make particular mention, with regard to that infliction, of a 'thick stinking mist which advanced from the east and spread over Italy; there could be no deception in so palpable a phenomenon.' The Abbé Huc, a Jesuit missionary, who travelled much in China, gives a curious and striking description, gathered from the Chinese, of a 'mist' seen in the province of Shantung, north China, which proved to be a precursor of cholera.—*The Chinese Empire*, p. 286.

The invasions of cholera in this country have been similarly heralded or

pastures where the cattle grazed, insomuch that whole herds returned home sick; being very dull, forbearing their food, and most of them would die in twenty-four hours. Upon dissection there were discovered large and corrupted spleens, sphacelous and corrupted tongues, and some had angina maligna. Those persons who carelessly managed their cattle, without a due regard to their own health, were themselves infected, and died like their beasts. Some imputed it to the witchcraft of three Capucins in Switzerland, who were killed; but,' says he, 'this contagion may perhaps proceed from some noxious exhalations emitted from the earth, by three distinct earthquakes, perceived here in the space of one year.' The treatment was simple—generally scraping or cleaning the tongue, washing it with a lotion of salt and vinegar, and the administration of garlic, or a dose of gunpowder, soot, brimstone, and salt. Dr Slare adds in a postscript: 'I lately received an account from two ingenious travellers, who assured me the contagion had reached their quarters on the borders of Poland, having passed quite through Germany, and that the method used in our relation preserved and cured their cattle. They told me the contagion was observed to make its progress daily, spreading near two German miles in twenty-four hours. This, they say, was certainly observed by many curious persons, that it continually, without intermission, made its progress, and suffered no neighbouring parish to escape; but it did not at the same time infect places at great distances. They added that cattle at rack and manger were equally infected with those in the field.'[1] Dr Slare fancied the infection was conveyed by some volatile insect. On the 20th of June, at Nördlingen, it was noted, 'we yesterday saw the first symptoms of

accompanied. Dr Williams, in his 'Principles of Medicine,' remarks: 'The prevalence of the south-east wind was observed to be particularly favourable to the increase of both cholera and influenza; and I cannot but think that this had some connection with the general tendency exhibited by the former to spread from east to west. Has the morbific property of this wind aught to do with the haziness of the air when it prevails—a haziness seen in the country remote from smoke, and quite distinct from fog? What is this haze? In the west of England a hazy day in spring is called a blight.' In more recent times, so late as 1866, a *blue* mist was noticed in England during the mild visitation of cholera.

[1] An Account of a Murren in Switzerland, and the Method of its Cure. Philosophical Transactions, vol. xiii.

this disease in our town's-cattle. It was called the "flying cancer" (*fliegende krebs*), and it travelled, in twenty-four hours, two leagues in length by four miles in breadth.'[1]

In August it was in Saxony, where it was observed that it travelled at the above rate.[2] In the *Journal des Savans* for that period, we find the following account: 'This disease, which is perhaps the same as that which the last news informed us was afflicting Flanders and Catalonia, commenced in the summer in the Lyonnais and Dauphiné, and spread with fury to many other provinces of the kingdom. The cattle which were attacked ate, worked, and performed all their other ordinary functions of life, until all at once they were seen to fall and die. There formed on the tongue a black or violet-coloured vesicle which formed an eschar in five or six hours. This no sooner fell off than the animals died. In some of those which were opened, the entrails appeared as if rotten, and the tongue for the most part gangrenous and falling to pieces. All kinds of remedies were tried against the disease, but that which answered best was to rub the vesicle on the tongue with a piece of silver until the blood came. After this the wound was dressed with vinegar in which was dissolved salt and pepper. This disease was so contagious, that it was easily contracted by simply touching anything that had been near the part affected. A man lost his life through being helped to food from a spoon which had been used to rub the tongue of a diseased ox, and a gentleman of a town in Guienne was attacked by the malady in consequence of having put in his pocket a piece of thirty sous with which his farmer had scraped another affected animal's tongue. He was treated like the ox, and recovered.'[3]

[1] Nachricht aus Welschland und Spanien wegen Bezauberung des Viehs. 1682.

[2] *Vogels.* Annalen von Leipzig, p. 816.

[3] Journal des Savans, 1682, p. 399. The quaint veterinary writer, Leonard Mascal (Of Oxen, Horses, Sheepes, Hogges, Dogges. London, 1596), is the earliest writer in England whom I can find describing the *blaine*, or glossanthrax. There is no proof that the disease ever reached Britain during the progress of those great epizoöties of this nature which marched in such a mysterious, yet regular, course on the continent of Europe. The outbreak of 1252, among horses and cattle, appears to have been limited to England, and from what Mascal relates, the malady would seem to have existed in this country from time immemorial, and to have been due to local and other circumscribed influences.

A.D. 1683-4. The winters of these years were the coldest ever known; the summers were rainy, and the autumns cold. Gloss-anthrax was yet prevalent in Germany. 'The summer of the first year was again very wet. On the 25th of November great cold set in, which lasted until the 6th of February the next year. The ensuing summer was very hot and dry; then came an early harvest. In both these years there raged an epizoöty among cattle, called the burning cancer (*brennende krebs*). Small silver saws were used to scrape off the blisters or ulcers from the tongues.'[1]

A.D. 1685. 'In November, a plague amongst cattle began at Groeblowitzius, Tschechnitius, where all perished of an unknown infection. Some we sent to Kuntzendorsum, but there also they all died. No medicines, no remedies availed aught, although we tried many.'[2] Heusinger suspects this was a variolous affection. In the spring an immense flight of grasshoppers destroyed all the corn, the vines, willows, pulse, and hemp in Languedoc.

A.D. 1686. Friesland inundated, and many thousands of men and cattle drowned. A terrific hail-storm did an immense amount of damage. After the capture of Luxembourg by the French, the army suffered from scurvy. 'After this expedition, when the army was approaching the town of Treves, on the Moselle, it came to the Monastery of St Matthew the apostle, for whose feast a countryman had kept a team of three fine horses. Having no place where he could put them, they were left without fodder for three days in the part where the inhabitants of the Monastery were accustomed to urinate. The horses, oppressed with hunger, devoured the long grass which was impregnated with urine, and when their master saw this, he prognosticated they would suffer; and the result proved him to be correct, for the fattest of them was seized around its feet and legs, and at length over its whole body, with scabs and fœtid ulcers, and being led out by its master in the middle of the night into the pasture-land where numbers of horses of the Gallic army were feeding, it infected many, and spread this pest as if it had been

[1] *Steubing.* Topographie der Stadt Herborn, p. 21.
[2] *Fibiger.* Acta Mag. Wratislaw. *Stensel.* Scrip. rer. Silesia.

an endemic among the troops. One of the remaining two wasted away from the disease and died; the other became immensely swollen in the abdomen, and also died. The men with scurvy had the same symptoms as these horses exhibited.'[1] This may have been an outbreak of farcy. In July all the cattle in Stein, Gröblowitz, and Metzdorf (Silesia) were affected with 'foot and mouth disease' (*pelle ex lingua et ungulis decentibus*—aphthous fever).[2] Diderich in his 'Historia Pestis' says: 'I have remarked among my cows in Schamburg, near Custrine, in the year 1686, as well as among all the other cattle in the place, that, in the middle of the winter, fourteen days after each other, and without a single exception, all were thoroughly salivated, just as happens when the old women of Hamburg cure the *French*, and other chronic diseases, with mercury. Nevertheless, no single head died, although during the whole time the stock could eat but little. This strange sickness was not remarked beyond this place.'[3]

A.D. 1688. 'The winter was severely cold in Germany, with great snow, followed by a sudden thaw and heat. In summer broke forth an epidemic catarrh, with danger of suffocation. . . It was called the hot catarrh, for the matter discharged by the nose was very thin, clear, and hot. A slight fever attended the defluxions. . . . About the middle of May began a fever in London, and all over England, which reached and spread all over Ireland in July. The symptoms were the same in all. It began and ended its course in seven weeks. . . . Though not one of fifteen escaped it, yet not one of a thousand that had it died. It was generally observed, both in England and Ireland, that some times before the fever began a slight but universal disease seized horses, viz. a great defluxion of rheum from their noses. This fever spread all over Europe from east to west.'[4] 'An epidemic of influenza in England and at Dublin, which was preceded by a distemper attended by nasal defluxion (thought to be glanders) among horses, especially those belonging to the king's

[1] *Eggerdes.* Ephem. Nat. Curios., p. 416.
[2] *Stenzel.* Scrip. Siles., vol. ii. p. 363.
[3] *Kanold.* Jahreshistorie von d. Seuchen des Viehs. p. 80.
[4] *Dr Short.* Op. cit., vol. i. p. 455.

army, then encamped on the Curragh of Kildare.'[1] 'Earthquake of Smyrna. Swarms of insects foreboded a pestilence; an epidemic catarrh followed all over Europe, beginning among horses and ending with men, as is frequently the case.'[2]

Great swarms of insects are mentioned by Sir Thomas Molyneux as infesting Ireland and eating up everything of the herbage and leaves of trees and plants. In this account 'concerning the swarms of insects that of late years have much infested some parts of the province of Connaught, in Ireland,' he says, 'The first time great numbers of insects were taken notice of in this kingdom, I find, was in the year 1688. They appeared on the south-west coast of the county of Galloway (Galway), brought thither by a south-west wind,—one of the common, I might almost say trade-winds, of this country, it blows so much more from this quarter in Ireland than all the rest of the compass.' They passed inland towards Headford, 'and in the adjacent country, multitudes of them showed themselves among the trees and hedges in the day-time, hanging by the boughs, thousands together, in clusters, sticking to the back one of another, as in the manner of bees when they swarm. . . . Those that were travelling on the roads or abroad in the fields found it very uneasy to make their way through them, they would so beat and knock themselves against their faces in their flight, and with such a force as to smart the place where they hit, and leave a slight mark behind them. . . . A short while after their coming, they had so entirely eat up and destroyed all the leaves of the trees

[1] *Dr Thompson.* Annals of Influenza, Sydenham Soc. 1852.

[2] *T. Forster.* Atmospherical Origin of Epidemic Disorders of Health, p. 162. A curious superstition was formerly prevalent regarding St Stephen's Day (Dec. 26th), viz. that horses should then, after being first well galloped, be copiously let blood, to insure them against disease in the following year. In Barnaby Googe's translation of Naogeorgus, the following lines occur relative to this popular notion:

> 'Then followeth Saint Stephen's Day, whereon doth every man
> His horses jaunt and course abrode, as swiftly as he can,
> Until they doe extreemely sweate, and then they let them blood,
> For this being done upon this day, they say doth do them good,
> And keeps them from all maladies and sicknesse through the yeare,
> As if that Steven any time tooke charge of horses heare.'

The origin of this practice is very ancient and somewhat obscure, but the antiquary Douce supposes it to have been introduced into Britain by the Danes.

for some miles about, that the whole country—though it was in the middle of summer, was left as bare and naked as if it had been the depth of winter, making a most unseemly and, indeed, frightful appearance; and the noise they made whilst they were seizing and devouring this their prey was as surprising, for the grinding of the leaves in the mouths of this vast multitude altogether made a noise very much resembling the sawing of timber.' Every green thing was devoured by these animals, and 'out of the gardens they got into the houses, where numbers of them, crawling about, were very irksome.' And in the ensuing spring of 1689 their 'spawn, which they lodged underground, next the upper sod of the earth, did more harm in that close retirement than all the flying swarms of their parents had done abroad, for this young destructive brood did not withhold from what was much more necessary to have been spared,' but devoured 'the roots of the corn and grass, and eating them up, ruined both the support of man and beast.' The insect appears to have been the *Melolontha vulgaris*, or common cockchafer. This plague was checked as follows: 'High winds, wet and misly weather, were extremely disagreeable to the nature of this insect, and so prejudicial as to destroy many millions of them in one day's time. . . . During these unfavourable seasons of weather, the swine and poultry of the country at length grew so cunning as to watch under the trees for their falling,' and eat them in abundance; and the author was assured 'that the poorer sort of the native Irish (the country then labouring under a scarcity of provisions) had a way of dressing them, and lived upon them as food.' It was also found that smoke was very offensive to them, and therefore large numbers were got rid of 'by burning heath, fern, and such like weeds,' in their vicinity. Towards the end of summer they began to disperse; 'and so wholly disappeared, that in a few days you should not see one left in all those parts that was so lately pestered with them.' During the ensuing spring 'great quantities of the eggs of this insect were exposed, on ploughing or digging up the ground.'

Rutty, describing this influenza in man, mentions that an 'universal distemper seized the horses in Dublin.'[1]

[1] *Rutty.* History of the Weather and Seasons.

A.D. 1689. In mankind, 'spotted fever, small-pox, and others; then followed murrain of sheep.'[1]

A.D. 1690. Ramazzini writes: 'For the first four or five years preceding this, the whole of Italy had experienced uncommonly dry weather, during which time all the crops were most abundant, and it was imagined that there would be universal good health; for it is commonly and correctly believed that everything is more healthy in dry weather. In the year preceding this, however (1689), about the time of the equinox, heavy rains fell, which continuing during the whole spring of the year, produced an unfavourable season. The summer continued for the most part rainy. About the time of the summer solstice signs of rust[2] (*rubigo*) in the wheat began to be observed, which

[1] *T. Forster.* Loc. cit.

[2] The rust of plants, the Ερυσιβη of the Greeks, *robigo* of the Romans, who had their fiction regarding the god Robigus, and their *Robigalia* or *Robigalia festa* in his honour to avert this destroyer, the *rouille* of the French, *der rost* of the Germans, and the *rubigo* of the botanist, has been known from the earliest times, but it may well be doubted if, until modern days, many diseases of plants have not been included in this term. It is only within a few years that the study of the various microscopical fungi has revealed the true nature of the enphytozics or epiphytozics to which they give rise. Unger was of opinion that the causes which led to their appearance in the plant are to be found in the ground, the electricity of the atmosphere, humidity, and the absence of light. Theophrastus thought rust was due to the rays of the full moon, and Diogenes Laertius relates how the philosopher Empedocles preserved the crops of Agrigentum against the rust by hanging up the skins of animals between them and the north wind. The physicians of the sixteenth century imagined its appearance was owing to a malignant dew, and in the south of France at the present day the agriculturists are so persuaded that the rust of wheat is due to a fog or mist, that they term it the *maladie brouillard.* The generative faculty and contagious character of the several fungi are not yet sufficiently known to be definitely pronounced upon. Mr Cook, in his excellent little work on 'Microscopi Fungi,' says of them: 'Unfortunately, this group of fungi contains species but too well known for their ravages amongst graminaceous plants, especially the cereals. "Corn rust," as it is generally called, has a reputation little better than mildew, and it really deserves no better, for it is only another form of that pest of the farm, from the mycelium of which the corn-mildew is at length developed. There are two species very closely allied (doubtless only forms of the same species with different spores) which attack the leaves and culms of growing corn, and bursting through the cuticle, give a peculiar rusty appearance to the plant. One of these corn-rusts is botanically termed *Trichobasis rubigo-vera*, or the "true rust *Trichobasis*," the latter, which is the generic name, being a compound of two Greek words (*thrix*, a hair, and *basis*, a foundation), on account of the spores being at first furnished at their base with a short, thread-like peduncle, which at length falls away. The other corn-rust is *Trichobasis linearis*, or "line-like *Trichobasis*," because the sori or pustules are linear, or lengthened out like a line;

perceptibly increasing, proved highly obnoxious to the grain, covering, as it did, the plants from the stalk to the ear with spots like blood. This pestilence also attacked beans and all other kinds of pulse; so that in a few days were destroyed all the preconceived hopes for the prosperity of the year. Nevertheless, the extreme fertility of the previous years had enabled them to lay up some store for the future, and this lessened the calamity. In the beginning of September, and yet more at the exact time of the equinox, rain fell more copiously, and lasted throughout the whole month of October, and as a consequence, the banks of the rivers could with difficulty restrain the tremendous power of the floods flowing between them. The two last months were nearly rainless, and the year 1689 closed with favourable weather. But in the beginning of the year 1660 (during which the pestilence of rust, by eating into the corn and every other kind of crop, brought desperate fevers first to those in the country, then to those in the town), the rain returning, but more heavily and nearly continuously, clouded the minds of all. Thus we passed a dreadful winter, with

the spores nearly double the length of those of the other corn-rust, and not so bright in colour. By intermediate forms these two rusts pass insensibly the one into the other, so that it is sometimes difficult to distinguish them. Both have the spores clustered together in the pustules, at first attached by their peduncles, but they soon become free, and are scattered like rust powder over the plant.'

There can be no doubt whatever, that plants infested by these minute fungi, and used as food by animals, often cause diseases of a serious nature, and this fact was well known to the old physicians. We have here the evidence of Ramazzini, and others will be found in this history. Niemann declared that sheep would not eat wheaten or oaten straw when it was covered with rust or Puccinia.—*Gasparin*, p. 236.

M. Gohier gives many examples of epizoöties which he believed were caused by the rust of straw.—*Sur les effets des Pailles Rouillés*. Lyons, 1804.

Gerlach maintains that straw covered with *Uredo linearis* and *Uredo rubigovera* is often the cause of anthrax. He also observes that horses employed to carry away colewort were often attacked by ptyalism, and that this might be due to the *Stellaria media*, which was very plentiful, and was always covered with *Uredo caryophyllacearum*; for he noticed this affection in sheep which had pastured on the *Stellaria media*. The same author also testifies to anthrax being due to vetches and clover infested by *Uredo leguminosarum*, and that the *Puccinia pisi* or 'pea rust,' has been the cause of abortions in sheep, inversion of the uterus, and puerperal fever.—*Mag. F. Thierheilk*, vii. p. 216.

Metaxa has witnessed the production of anthrax after the use of food contaminated by *Uredo rubigo*.—Annali, ix. p. 68. Other veterinary authorities might be quoted in support of the above assertion.

constant rains, accompanied by intense cold, and snow which kept falling and thawing. The month of March, however, contrary to custom, was without rain, and remaining so up to the time of the equinox, with great serenity of the atmosphere, raised our spirits; when, once more, the heavens seemed to let loose upon us all the water contained in their bosom; so that for the space of a night and a day everything was full of water, and this State (Lombardy) presented the appearance of an island. In the beginning of June signs of rust appeared, as in the previous year. The mulberry first became affected. The same blight, the worst disease that attacks crops, increasing little by little, soon laid hold of the corn and all kinds of pulse, but especially beans; and it did this not only on the low ground where the water was stagnant, but also in the more elevated places, and on the very hills themselves. It was a most grievous and deplorable sight for the eyes to look around, and see the fields not green, but black and covered with a kind of soot. For as in the preceding year this disease had covered the corn with a red colour, so in this year it sprinkled it with a carbonaceous matter known as the great smut[1] (*magna atredo*). In the whole

[1] Mr Cooke says regarding this agricultural pest:—'One of the fungal diseases of corn long and widely known has obtained amongst agriculturists different appellations in different localities. In some it is the "smut," in others it is respectively "dust-brand," "burnt-ear," "black-ball," and "chimney-sweeper," all referring, more or less, to the blackish soot-like dust with which the infected and abortive ears are covered. This fungus does not generally excite so much concern amongst farmers as the other affections to which their corn crops are liable. Perhaps it is really not so extensively injurious, although it entirely destroys every ear of corn upon which it establishes itself. Wheat, barley, oats, rye, and many grasses are subject to its attacks, and farmers have been heard to declare that they like to see a little of it, because its presence proves the general excellence of the whole crop. No one who has passed through a field of standing corn, after its greenness has passed away, but before it is fully ripe, can have failed to notice, here and there, a spare lean-looking ear, completely blackened with a coating of minute dust. If he has been guilty of brushing in amongst the corn, it will still be remembered how his hands and clothing became dusted with this powder; and if at the time he should have been clad in sombre black, evidence will have been afforded—in the rusty-looking tint of the powder when sprinkled upon his black continuations—that, however sooty this powder might appear whilst still adhering to the ears of corn, it has an evident brown tint when in contact with one's clothes. This powder, minute as it is, every granule of it constitutes a spore or protospore capable of germination, and ultimately, after several intermediate stages, of reproducing a fungus like the parent of which it formed a part. During

of the province of Este, which is usually the most fruitful of all, the vintage had never been so poor, whole bunches of grapes being eaten away slowly by this pest. Nuts alone, which, strange to say, in the preceding years had been very scanty, were not

the growth of the plant its virulent contents flow like a poison through the innermost tissues, and at length attack the peduncle or axis of the spikelets of the ear, raising up the essential organs and reducing them to a rudimentary state. Brongniart, who made this species the special subject of observation, states that the fleshy mass which is occupied by the fungus consists entirely of uniform tissue, presenting large, almost quadrilateral cavities, separated by walls, composed of one or two layers of very small cells filled with a compact homogeneous mass of very minute granules, perfectly spherical and equal, slightly adhering to each other, and at first green, afterwards free or simply conglomerate towards the centre of each mass, and of a pale rufous hue ; at length the cellular walls disappear, the globules become completely insulated, and the whole mass is changed into a heap of powder consisting of very regular globules, perfectly alike, black, and just like the reproductive-bodies of other fungi. . . . The spores in this species are exceedingly minute. It has been ascertained that forty-nine of them would be contained within a space the one hundred and sixty thousandth part of a square inch ; hence one square inch of surface would contain little less than eight millions. These myriads of spores are shed from the ears, and nothing remains but the barren matrix in which they were borne when the farmer proceeds to gather in his crops. At that time he sees no more of the "smut," all remembrance of it for the time is gone ; his only thought is to stack his corn in good condition. But the millions of spores are dispersed, ten millions at least for every ear that has been "smutted," and will they not, many of them, reappear next year, and thus year after year, with as much certainty as the grain upon which they are parasitic ? Like many of the parasitic fungi, so destructive in the farm and the garden, this species belongs to the family in which the spores are the distinctive feature. After many botanical changes, the "smut" is at length regarded as a fixed resident in the genus *Ustilago*, with the specific name of *Segetum*, which latter signifies "standing corn ;" it is therefore the *Ustilago*, or *Smut of the standing corn*.'—*Ibidem*, p. 76.

The reports as to the effects of these fungi on the health of animals are conflicting. Some authors assert that they are innocuous, others that they cause disease. Among the latter we may cite Gerlach, who reports that geese and ducks to which he had given the refuse of bunted wheat died from anthrax. A more striking example is the following : 'In the years 1842 and 1844, I have observed in one farm a gangrenous fever and real anthrax among horses. Instead of oats they had been fed on wheat, and then on the refuse of bunted wheat ; shortly afterwards they were attacked by indigestion, the fæces were hard, and the balls which were evacuated were covered with flakes of mucus ; daily they were seized with colics, and the slightest occasion, such as a chill, over-exertion, &c., would bring on a typhus or gangrenous fever and a true form of anthrax of such a violent description, that in one day two or three animals would become ill and die.' In the same journal (*Magazin für Thierheilkunde*) an observation is given which would go to prove that the forage obtained from wheat that has been affected with smut will cause abortion in cows, and another observation that it may induce what is known as the 'arthritis' of lambs.

affected by the mildew.' Nearly all the vegetables were destroyed, as by a blast from heaven.

'Even another species of destruction was added to this, for caterpillars and insects laid waste whole gardens, leaving the plots bare. A similar disease appeared in melons, so that animals rejected them as food. The heavy rains, which had almost unremittingly continued up to the end of July, were followed by a dry period of nearly two months; it was nevertheless unaccompanied by great heat. Animals of every species showed the effects of the long-delayed drought, by dying in great numbers. Sheep were first attacked, and, after they had sickened for a few days, variolous eruptions appeared on their heads and necks, and generally caused blindness; so that, if they did not perish from the virulence of the disease, they at length died from hunger. Pigs also perished in droves from suffocation. . . . That which was the cause of death in animals, in my opinion, arose from the acid nature of the mildew; for not taking into consideration the morbid constitution of the atmosphere, which was no doubt noxious to beasts, on account of the contaminated character of the forage, the blood became acid and circulated feebly, and either whole flocks of sheep died suddenly, or were seized with small-pox; for one can confidently assert that the eruption which appeared on the head, neck, and legs was undoubtedly variolous, when neither in shape, nor in colour, nor in the matter contained in them, nor in their size, nor in the way in which after suppuration a black scab remained, did the pustules differ from those of small-pox in children. In like manner, other animals suffered from the diseased plants. Even bees, extracting no sweetness from the calyces of the flowers, but a bitter poison, either died or left the country. And it is not to be wondered at that cicadæ in this year were mute; for although there was heat in the summer, it had no influence in exciting them to sing, probably because they did not obtain the nutritious food necessary, or they had for the most part died.'[1]

'In the year 1690, and on the 13th of March, I observed an epidemic among dogs at Anda, of an anginous character. After

[1] *Ramazzini.* Const. Epid. Op., ed. Geneva, p. 120—141.

a very misty night, domestic and sporting dogs, besides three others, all perished in the town, of which, out of curiosity, I took the trouble to take twenty-one for examination, and I found their necks swollen externally, and their fauces internally, while the muscles of their throats were much inflamed.'[1] Wirth ascribes the losses in Italy amongst the cattle, sheep, and other animals, to anthrax.[2] Miliary fevers or sweating sickness committed great ravages in mankind in Stuttgart, Dusseldorf, Erfurt, and Jena. Spain and Italy also suffered much from *epidemic* diseases.

Locusts invaded Poland and Lithuania in three bodies, and in three different directions. The Abbé Ussans, who was an eye-witness, says that in some places where they had died on the top of each other, they lay in masses four feet high. Those which were alive and took refuge on the trees, bent the branches to the ground, so great was their number and weight. The people believed that they had Hebrew characters on their wings, and a rabbi pretended to translate them as the 'wrath of God.' Rains came and killed them, and their putrefying bodies so infected the air, that the stench was nearly insupportable. Cattle which grazed in the fields afterwards, also died in great numbers, and very quickly.[3]

A.D. 1691. Glossanthrax in Switzerland. Ramazzini continues, 'The character of the weather in this year ('91) was dry and dusty; at first, on account of the north winds, and afterwards because of the continual and scorching heat. As the month of January was drawing to a close, strong north winds blowing at the time, so intense a cold set in that the rivers were frozen over, and everything was stiff with frost. But since no snow fell, we suffered not only a very cold, but also a very dry winter. About the time of the equinox the frost broke up, and so sudden was the change from intense cold to immoderate heat, that from the time of the equinox to the end of March, the weather did not differ much from summer. In the month of April the heat somewhat relaxed, but it remained as dry as be-

[1] *Stegmann.* Ephem. Nat. Cur., p. 384. [2] *Wirth.* Op. cit., p. 85.
[3] *L. Figuier.* Les Insectes, 1867, p. 366.

fore. This dry state of the atmosphere continued to May, with the exception of a few moderate showers, so that we suffered from a great lack of herbage in this year; beans, also, and all kind of pulse became dried up, because of the want of moisture, and but a scanty hope remained that a good harvest would be the result. In the same way as in the preceding year, great destruction was caused to animals, and especially to sheep, so that the whole of the ovine race was nearly swept away. So hot a summer succeeded as had never been seen before; the Etesian winds brought no alleviation of the continual heat, and on this account many animals, and especially dogs, were driven to madness. . . . This tempest of diseases entirely disappeared, except small-pox, which was increased to such a pitch by the intense heat, that not only were young people attacked, but even the aged, and especially those who were pregnant.'[1]

A.D. 1691-93. Eruption of Mount Etna. Earthquakes felt in England, France, and Germany. Swarms of locusts from the east invaded Germany. 'The winter of this year ('91) was seasonable; the whole year, indeed, was a favourable one. The following year, however, was not marked with the same moderation. The winter was mild, and had the character of spring, and to it succeeded a spring with the character of winter, as if the seasons had been changed; and from the vernal equinox up to the solstice, frosts, with strong north winds, were continual, and the rains were so frequent and heavy, that rivers everywhere broke down their banks and inundated the country. Every one was already prepared for an unpropitious and unhealthy year, both on account of the destructive nature of the rains, which indicate disease to seedling plants, and also because of the apparent signs of blight on the leaves of the mulberry tree, which is a forerunner of sterility, as we had experienced in previous years in the great calamity which then attacked the cispadane and transpadane countries. The summer that followed up to the dog days seemed like spring, and what appeared very strange, the nightingale was heard to sing in the vineyards before the cicadæ were observed. Thus the summer arrived with the mild-

[1] *Ramazzini.* Op. cit., p. 157—186.

est state of the atmosphere; but yet to us it was unseasonable, rains from time to time falling with great force. Hence, on account of the moist state of the soil, and the moderate temperature, all kinds of grain grew to so great a height and luxuriance that the fear of a bad harvest speedily left the minds of all. But an unforeseen mildew speedily dispelled their hopes, for the wheat, barley, and all kinds of pulse were quickly demolished, as if stricken by a blast from heaven. The same contagious blight struck the whole cispadane and transpadane country. The epidemic disease, which, in these three years, all so dissimilar in their character, had filled both city and country with many deaths, was the purpurata or petechial fever (scurvy).'[1] In Hesse, for 1693, Valentine describes a pulmonic affection among cattle, which killed great numbers. He says, 'The preceding winter being wet, but towards the close very cold, at the beginning of spring an unusual heat set in, and continued throughout the whole summer; which sudden change produced an unequal and unnatural motion of the humours and breath, followed by death to man and beast. Oxen and cows succumbed in numbers. Amongst other causes, a corrosive dew, which spotted linen with marks more or less dark-coloured, and corroded everything, was supposed to produce ill effects. From the observations of the butchers, it was proved that these animals died from pulmonary phthisis (*phthisi pulmonali necabantur*), to which, without doubt, the severe cold after the intense heat much contributed. At the end of July and the beginning of August, besides dysentery and malignant fevers, a certain intermittent fever, like tertian fever, attacked man.'[2]

Wirth, and a few other veterinary writers, have imagined this outbreak to be an epizoöty of contagious pleuro-pneumonia, but there is every reason to doubt the correctness of their surmise. That malady was not known for certain till a later period.

A.D. 1692. In October swarms of locusts appeared in Pembrokeshire and the coasts of Wales; they seem, from the description, to have been the true eastern locust.[3]

[1] *Ramazzini.* Op. cit., 187—193.

[2] *M. B. Valentini.* Constitutio Epid. Hassiaca. Ephem. Nat. Curios. *Sydenham.* Op. ed. Geneva. Vol. i. p. 276.

[3] Philosophical Transactions.

A.D. 1693. An earthquake, the shocks of which were perceived in England, France, and Germany, but particularly in Sicily; also an eruption of Mount Etna. An invasion of locusts in Germany, proceeding from the east. Saxony more especially suffered from their ravages. Epizoötic catarrh among horses in Europe, followed by epidemic catarrh in October.[1] 'In Britain and Ireland, October was a course of moderately warm weather for the season; but some snow falling in the mountains and in the country, it turned suddenly extremely cold, and there quickly succeeded a hard frost for some few days at least. After this followed such a general cough and cold, as not one out of thirty escaped. . . . It spent its fury in five weeks. It was three weeks sooner in England than in Ireland. It not only affected these, but the whole continent, though not all at the same time.'[2] 'In October, an influenza began among horses, and then attacked men, as usual.'[3]

A.D. 1694. An eruption of Mount Vesuvius. A supposed epidemy and epizoöty of ergotism. Brunner writes: 'By what unfortunate combination of circumstances, for so many years, the whole of nature seemed to labour under an unhealthy atmosphere, remains a secret. Many men, and those most learned, have written on the state of the air, and I have been a spectator of most grievous calamities; for not only did unwonted fevers attack and kill the human race, and would submit to no remedies, but also the beasts were harassed by deadly diseases. I know that sheep, cattle, pigs, horses, and geese were not free from the contagion. There was also a lack of corn, not only on account of the inordinate consumption of it by the soldiers, but also from the character of the ground. Some of the corn was so plainly diseased, that it was dangerous for man to eat of it. I know also that peas, which formed a great part of the food of the army, were infested and diseased by a small insect which made a minute hole in them. I never remember seeing such an abundant crop of darnel (or tares) mixed with the oats, and which prevented the making of good oatmeal, our chief food, for it was needless to

[1] *Webster.* Op. cit., vol. i. p. 335.
[2] *Short.* Op. cit., vol. i. p. 395. Philosophical Transactions.
[3] *T. Forster.* Op. cit., p. 163.

attempt to labour on it, it was so bad. All grain disappeared, and in its place small, black, horn-shaped masses became apparent, which were highly injurious to mankind. These were named "St Martin's corn." A woman was shown to me by a surgeon who suffered from convulsions every eleventh day, solely from eating this corrupt grain; and the same surgeon told me he had amputated a leg mortified from the same cause.'[1]

A.D. 1695. In the spring and summer of this year, many stinking fogs prevailed in Limerick and Tipperary. During the winter, spring, and part of the harvest, there fell in several places a kind of thick dew like butter, soft, clammy, and of a dark yellow colour. It fell in the night, chiefly in marshy low grounds, on grass, and the thatch of cabins. It seldom fell twice in the same place. It lay near a fortnight on the earth, then changed colour, turned dry and black. It fell often in lumps as big as one's finger-end, lay thin and scattered, had a strong ill scent. Country people used it for scabs or sore heads with great success. Cattle browsed safely on the ground where it fell.[2] Apoplexy became quite epidemic in Italy, from the excessive scorching heat and great drought of the summers of 1693 and '94, which were followed by most severe winters, and continued heavy rains from October, '94, to April, '95. Volcanic eruptions and earthquakes were frequent. In Banda, the volcano of Mount Gounoug Apy vomited forth fire and ashes in such heaps that the sea at its base became dry land. The stench of brimstone was so intolerable, that during the westerly monsoon it could not be endured in the streets of Neira. The noise was terrific. Banda was in a great terror, and much sickness prevailed in Neira. The rains tasted sour from the sulphureous fumes, and the whole country became a desert through the fire, stones, and ashes thrown over it.[3] Inflammation of the feet of cattle in Hesse, coincidently with aphthæ in man. 'At the time of the autumnal equinox (towards the end of August), mankind was afflicted by an inflammation in the gums, tongue, and mouth. I also observed, here and there, an inflammation in

[1] *Brunner.* Ephem. Nat. Curios. Dec. 1694.
[2] Philosophical Transactions. *Dr Short.* Op. cit., vol. i. p. 402.
[3] *Dr Short.* Op. cit., vol. i. p. 399.

the feet of brutes (*in brutis verum pedum inflammationes*).'[1] At Pesth, in Hungary, Rayger writes, 'On the seventh of June, the dew was noticed to be of a purple colour on the leaves of the trees and vines; also on the linen garments of the men labouring in the vineyards, where it exactly resembled the colour of spots of mulberry or cherry juice.'[2]

A.D. 1697. In Sweden, glossanthrax in cattle.[3] Epidemic small-pox was very prevalent in the human species in Germany, at Augsburg, Stuttgart, Bâle, &c. Stegmann says, 'In the month of February of this year, dogs were observed to die in some places from an epidemic disease marked by a burning fever. When their bodies were dissected, nothing was found worthy of remark except thickened blood, and a quantity of black bile. . . . In the same month of this year fowls, pigeons, and geese perished from an epidemic; under their wings were found ulcerated pustules, and when their bodies were dissected, the liver was observed to be dry and parched.'[4] November and December, '98. 'In these months, small-pox attacked men of all ages, for I saw a woman more than seventy years of age, and a man more than sixty, both stricken with the disease. Animals, also, were not free from the small-pox; of these the winged tribe, but particularly geese and poultry, nearly all perished. Sheep and pigs, however, which were given purging draughts with care (such as ashes of the stalks of beans or cut corn, mixed with human urine), for the most part recovered.'[5]

At a later period, I have entered into a review of the opinions of several eminent comparative pathologists on the variolous disorders of animals, and their transmissibility to different species. It may be remarked here, however, that the small-pox of birds is a malady which very ancient authors have noticed. Palladius,[6] for example (A.D. 300), in his description of the diseases of common poultry and peacocks, mentions an exanthematous affection by the name of *grana circa oculos*, which has been supposed to be this malady (*Heusinger*). '*Si amarum lupinum*

[1] *Sydenham.* Opp. Geneva, vol. i. p. 283.
[2] Ibid. Op. cit., p. 731. [3] *Schnurrer.* Op. cit., vol. ii. p. 229.
[4] *Stegmann.* Constat. Mansfeld. Ephem. Nat. Curios., p. 384.
[5] Ibid., p. 108. [6] Scrip. rer. Rustic. Edit. *Schneider.* Vol. iii.

comedant (gallinæ), sub oculis illis grana ipsa procedunt, quæ nisi acu leviter apertis pelliculis auferantur, exstinguunt.' Demetrius (A.D. 1261) says: '*Si in ore aut in alia corporis parte pustulæ sint, trade alteri accipitrem scite tenendum, tu vero acicula pustulas aperito, æsque sinito evaporari, deinde melle nosato illinito.*' And in De Cresentiis (A.D. 1233—1307),[1] we have a more decided designation: '*Item nascuntur columbis* varioli *circa oculus, qui excæcant eos, maxime mense Augusto. Vendendi sunt aut comedendi cum solo capite sunt infecti.*' Buhle and Bossi[2] assert that a disease similar to small-pox is known to affect turkeys, and that the Italians term it *coralli*. Nitsch[3] says that wild goslings and wild pigeons, when young, often have the small-pox (*pocken krankheit*). Bechstein[4] also declares that wild fowl are affected with the 'blattern,' and that the disease is contagious. In India the malady appears to have been known from the highest antiquity, and an English observer in quite recent days thus alludes to it: 'While on this subject, I would beg to submit to the society the propriety of inquiring into the exact nature of that disease among fowls, which is called small-pox, or *maota*, by the natives. In Calcutta it is not much heard of; but up the country, where almost every one is compelled to keep their own stock, it becomes a very interesting matter. It generally appears in the rains, and seems highly infectious or epidemic; when one fowl is attacked, it is generally followed by a succession of others, so as sometimes to depopulate the farm-yard. The symptoms are pyrexia and a refusal of food, soon after which pustules break out on the head, about the ears and eyes, and on the upper and lower surface of the tongue. Indeed, I believe they generally appear first in this latter situation. Afterwards they appear in different parts of the body, chiefly under the wings. The animal languishes for four or five days, and then dies. Is this disease at all allied to human variola? In its symptoms it bears a good deal of resemblance to it, and deserves, on that account, to be investigated.'[5]

[1] Opus Ruralium Commodorum, 1471.

[2] *Bossi.* Trattato de Malattie degli Ucelli. Milan, 1823.

[3] *Naumann.* Naturgesch. die Vögel Deutschlands, vol. i. p. 125.

[4] Naturgeschichte der Stubenvögel, pp. 20, 456.

[5] *Tytler.* Transactions of Med. and Phys. Soc. of Calcutta, vol. iv. p. 423.

The malady is probably prevalent at times in all hot countries, and affects different species of the feathered tribe. Guersent speaks of its frequency in pigeons in Italy. 'Birds, particularly ringdoves, are principally liable, in warm countries, to an eruption of pustules (*boutons*) very like those of variola; but this disease has not yet been well described. It is so common in Italy, that in a dove-cot containing a thousand pigeons, scarcely a hundred will be found which have not been affected; otherwise it is rarely grave, for at the most no more than a twentieth of those attacked die.'[1]

Swediaur, in describing the pian, or 'yaws,' a disease affecting the human species, and which is endemic in West Africa, Guiana, the West Indies, and Brazil, informs us that in the latter country young turkeys, chickens, and pigeons contract a disease accompanied by the eruption of tuberculous pustules, exactly like those seen in the squamous form of the yaws. 'The eruption takes place around the eyes, on the neck, on the wattles, and also on the crest of gallinaceous creatures. When they are affected, their feathers stand erect; they are dull and prostrated; they separate themselves from the other birds, and die in great numbers.'

The supposed variolous malady is very contagious, and various authors have asserted that, in Europe, turtle-doves have caught the infection of small-pox from man.[2]

As before noticed, it has been declared that the ovine small-pox was derived from the turkey; and many writers have affirmed that sheep were infected by fowls and turkeys.[3] Brugnone, Leroi, and Toggia fully recognize the analogy, if not identity, of the variola of turkeys with the variolous diseases of quadrupeds, and Toggia is strong in his belief that turkeys can communicate their small-pox to sheep. During a very deadly epizoöty of the disease among these birds this veterinarian endeavoured to preserve them by vaccination, but utterly failed.[4]

[1] Dict. des Sciences Médicales, vol. xiii. p. 87.

[2] Der Wohlerfahrene Thierarzt, vol. ii. p. 37. *Beckstein.* P. 557.

[3] Mem. de la Soc. Agricol. 1791, p. 145. *Gilbert.* Instruction sur le Claveau.

[4] Storia e Cura delle Malatti de Buoi, vol. iii. p. 221; vol. iv. p. 173.

Heusinger, however, is not quite satisfied as to the identity of this bird disease with small-pox.

A.D. 1698. Epidemic catarrh in France and an epizoöty among cattle, but especially horses, and which has been described as a bilious plague.[1]

A.D. 1699. 'Volcanoes and earthquakes. Widespread influenza in the human species in America all the previous winter, followed by malignant spotted and other fevers. Catarrh among horses, and then among people.'[2] 'In 1699 a severe and awful catarrh was epidemic in England, and the same malady, with much cough, was epizoötic among horses in England and France.'[3] The plague of insects in Ireland, noticed in 1688, appeared again this year.

In Germany, in 1700, small-pox was prevalent, and ergotism was very frequent. 'On the 4th July, A.D. 1699, a moisture of a sweet and glutinous character was observed on the corn and the leaves of trees and fruits. This honey-like substance, or dew, although of a sweet and pleasing flavour, seemed nevertheless to conceal a volatile pungency or sharpness; so that some of those who were sufficiently curious to touch it with their lips were immediately affected with a singular nausea and vomiting, and on the lips of several people a small ulcer appeared. A few persons, who had at that time delayed too long in the fields, were seized with burning fevers, and those who walked with naked feet, as the field labourers were accustomed to do, were suddenly attacked with pustules and ulcerations on them. Corn, also, and especially the grain of wheat, on which the dew had settled most largely, was diseased in a remarkable manner, being black and gross. This is what is commonly called 'blighted corn' (*mutter-korn*). But as in more fertile years the grain was marked in this way, so in the present was it very abundant, especially in the valleys and low grounds throughout the whole of Thuringia, and in the country and provinces around Erfurt; so that in the memory of man a more prolific crop had never been seen. From the use of this, instead of ordinary and

[1] *Bascome.* Op. cit. [2] *Forster.* Op. cit., p. 163.
[3] *Webster.* Op. cit., vol. i. p. 344.

good food, in the subsequent year (1700), men, both old and young, were afflicted with many epidemies.

'A dew of like consistency and flavour was noticed in the next year (1701), and came at spring-time. It was not so hurtful to corn as to apples and garden-stuff, in which it caused disease and worms.'[1]

[1] *Hoyerus.* De Rore Melleo. Miscellany Natural Curios., p. 172.

CHAPTER IV.

PERIOD FROM A.D. 1700 TO 1715.

In the advent of the 18th century, we have the commencement of a most interesting period with regard to the history of epizoötic diseases. Medical science was rapidly becoming more exact, in consequence of the greater care with which it was studied, the larger amount of patronage it was receiving, and the increasing number of great minds who set themselves to improve it. Some of the collateral sciences, which have since afforded medicine such welcome aid, were also attracting attention, and were being developed slowly, though surely, through the united or individual influence of philosophers and men of genius.

The diseases of the lower animals, especially those of an epizoötic character, were receiving more careful investigation, because of the great national interests involved; and from this time, we find a few of the most eminent physicians devoting all their energies in prosecuting researches of vast moment for the welfare of this department of comparative pathology. The descriptions of epizoötic diseases have been drawn up with the greatest care by these men, who spared no time or labour in inquiring into their nature, their origin, and the best means for their prevention, or for curing the pest-stricken herds and flocks.

Another feature or event in this century deserves notice. The veterinary art was progressing, though far more tardily than

human medicine. Until the middle of the century, in France, and indeed in every other country where the health of the domestic animals was at all cared for, those who ministered to their maladies were generally most incompetent for that office—being farriers (horse-shoers), shepherds, butchers, grooms, coachmen, and charlatans of every description, whose ignorance made them bold, but who, in the majority of instances, only added to the misery of their patients. Those who really intended to devote themselves to acquire a knowledge of animal diseases, took lessons from some one of these men who had acquired a reputation for superior skill. These individuals were generally to be found attached to the great stables belonging to kings or noblemen, or to regiments of cavalry. Notwithstanding the very meagre education they acquired, it was sometimes noted that distinguished men originated from these somewhat barren sources. But in reality the veterinary art was in a most unsatisfactory state until 1762. In this year M. Bourgelat, an advocate, seeing the great havoc caused by cattle and other animal plagues, was the means of establishing the first veterinary school at Lyons; and to this zealous veterinarian is due the honour of being the founder of modern scientific research, as applied to the medicine of the lower animals. The following year, the French government, ever in advance, and ever ready to befriend science, instituted the veterinary college now at Alfort, near Paris. By means of the great liberality exercised towards this institution, it became the focus of veterinary science and the parent of all other institutions established for a similar purpose, and it has remained since that time the first in the world. Many of its professors and graduates have afforded invaluable assistance in promoting their science, and some of them have greatly distinguished themselves in inquiries pertaining to epiozoötic maladies. A third government school was founded at Toulouse, and soon after Vienna had a national college established by order of Maria Theresa, which, remodelled and reorganized by Joseph II., is now the largest in Germany. Prussia quickly followed; for in 1768, so severely had that country suffered from animal plagues, that the illustrious Cothenius, physician to the King of Prussia, brought

before the Berlin Academy of Sciences a project for the establishment of a veterinary school in that city. The idea appears to have originated with the King himself, Frederick the Great; but through the able representations and zealous interposition of Cothenius, the national school was founded at Berlin, and it has proved of incalculable benefit to Prussia from that to the present time. At Munich, Dresden, Hanover, Carlsruhe, and Stuttgart, others sprang up. In Spain, a magnificent school was commenced; and in Italy four such establishments were soon flourishing. Holland, Switzerland, Denmark, Sweden, and Russia, with great liberality and discernment, founded colleges for teaching veterinary science. It was not until 1792, however, that England had a veterinary school, but this of a private and speculative nature, deriving no benefit from the State, but allowed to push its own way from the fluctuating support or patronage of private subscribers, and the fees of the students. The Scottish capital, in the beginning of the 19th century, through the patient and energetic exertions of a private individual, had a school; and in recent years others, also private, have been commenced in Glasgow and London. Unfortunately, however, and much to the cost of the country, veterinary medicine has not received that encouragement and confidence so necessary to the welfare of any branch of science. In Britain, it has been left to grapple with ignorance and empiricism. In many instances it has also, greatly to the detriment of commerce and the welfare of the nation, been ignored by prejudice and narrow-mindedness, and its representatives put aside for the self-sufficient amateur, the unlearned cow-leech, or the plausible impostor—a mode of proceeding which has kept it far behind, when compared with continental nations.

Consequently, to men of education and natural ability, it at present offers the most meagre inducements as a way to distinction or emolument; and the same public apathy which permits the ravages of disease to decimate our herds and flocks, also prevents those men from entering the profession and studying this science, whose object it is to avert or ameliorate these ravages.

From this change in the mode of investigating the diseases

of animals by scientific teachings and demonstrations on the continent, since the middle of the 18th century, it may easily be inferred that a great re-action would take place, and that those fearful scourges—fearful alike to the nations and to the animals which they visited, would receive much elucidation as science became more competent to observe and to speculate.

And this has been the case. The task of noting their beginning, their progress, their various phases, and their nature, has been removed from the domain of the oftentimes obscure general observer of passing events, whose abilities were nearly in all cases far from those of a scientific tendency, to a special domain swarming with anxious investigators; until, as we draw nearer to our own day, the real difficulty the chronicler has to contend with is the great number of authorities to be consulted, and the immense amount of matter he must examine before he can satisfy himself as to the best extracts for historical purposes.

A.D. 1701. An eruption of Vesuvius. The winter long and cold, followed by a dry and hot summer. In Suabia and in Germany generally, an epizoöty affecting cattle and other animals, which carried off large numbers. It was said to be a dropsy of the chest. 'At the commencement of spring the weather was cold, and continued so until the end of April. From this time, however, the heat was intense, and the scant and light rains made no impression on the parched state of the ground. No cold set in until the end of September, when frost appeared. After the slow germination, and contrary to all hope, the harvest and vintage were good; but the apples and pears fell from the trees before their time, in consequence of disease from worm; nor could they be preserved in any way, being too much destroyed. The leaves of the beech-trees were covered with an extraordinary quantity of gall-nuts, and cabbages were greatly damaged by being eaten into by caterpillars. Somewhere in the neighbourhood (our own district of Tubingen being safe), dropsy in the chest (*hydrops pectoris*) carried off many cows, and there was a great mortality among young geese in some places, so that they were obliged to be buried, on account of the stench. The summer induced great relaxation of the bowels. Infants were first attacked in the month of June, more in the month of July, in

which month a kind of griping diarrhœa affected adults, and at last cholera appeared, with vomiting and cramps in the legs.'[1]

A.D. 1702. A disease among horses on the banks of the Rhine, following cold and damp weather, and in Lombardy through a failure in the forage.[2] The weather in Yorkshire was so fearfully hot that within six miles' compass, in the month of April, thirty-six or thirty-seven draught of oxen were killed in ploughing. The same in other places.[3]

A.D. 1703. Very wet and damp. Inundations. In England a fearful thunder-storm. A great storm and flood at Bristol, in which 2000 sheep were drowned. At Berkeley 15,000 sheep were drowned, and multitudes of cattle on both banks of the Severn. An earthquake in Italy, during which springs of water became opaque and milky in colour, exhaled an odour of sulphur, and sometimes emitted foul-smelling gases.[4] Ergotism prevailed throughout the whole country of Frieburg. The diseases of horses and cattle were more frequent than in the preceding year. They appeared in Mantua, on the banks of the Rhine, in Prussia, and especially on the banks of the Oder. Kanold writes that 'the principal cause of these maladies consisted in the presence of immense moving swarms of vermin in Prussia, and especially in Elbingen, in the month of May. They fell upon the earth in such numbers, that they might have been gathered by shovelsful. They were considered by some people to be ants; nevertheless they were provided with four wings.'[5]

A.D. 1704. An eruption of Vesuvius. Epizoöties among horses in Germany, Alsace, in the Low Countries, and in Poland, where they died in great numbers. The diseases were believed to be contagious, and the importation of horses from these places into England was prohibited.[6]

A.D. 1705. A malignant *epidemic* fever broke out at Ceuta, causing great mortality. The post-mortem appearances of those

[1] *Camerarius.* Ephem. Nat. Cur. pp. 66, 67.

[2] *Kanold.* Jahreshistorie von den Seuchen des Viehes, von 1701 bis 1717. Budissin, 1721, p. 4.

[3] *T. Short.* Op. cit., p. 425. [4] *Schnurrer.* Vol. ii. p. 235.

[5] *Kanold.* Op. cit., p. 5. [6] Ibid. P. 7.

who died were as follows: the blood coagulated in the ventricles of the heart, especially in that of the right side, and also in the vena cavæ; the pulmonary artery was similarly engorged. In the aorta the blood was also very thick, but in moderate quantity; the pulmonary veins were nearly empty. These phenomena were not observed in all cases, since in the majority the blood was only thickened and not coagulated; and the cause of this difference was according to the greater or less degree of power of the *malignant ferment*. The mortality among horses in Poland still raging. Very many also dying in Saxony, and on the banks of the Rhine.[1] Glossanthrax again appeared in Dauphiné. Wirth says: 'In the year 1705 this disease again appeared in France, and a portion of Switzerland also suffered from it.'[2] We find noticed in this year an epizoöty among the chamois in Switzerland. It appears to have been cutaneous, and very deadly. 'A similar, and as it proved, a severe disease, resembling a leprous scab, attacked not only the old animals, but also many young ones. Upon the Freiburg were found this year numbers of dead chamois which had leprous skins. Of the nature and origin of this disease, the hunters have various opinions.'[3]

A.D. 1707. An eruption of Vesuvius, and an island five miles in circumference thrown up from the bottom of the sea in the Archipelago. An extraordinary and memorable invasion of flies in London. They covered the clothes of every one, and lay so thickly on the streets that the imprints of the people and horses' feet were made visible as if it had been snowing.[4] An aphthous malady attacked the feet and tongues of cattle in Franconia. 'A certain territory in our country was affected by a malignant disease which attacked vegetables, and from which animals sickened and died. In the course of the spring of this year, in the whole district of Hannaberg and Franconia, nearly

[1] *Kanold.* Op. cit., p. 7. Heusinger cannot find a description of the disease, and my researches have proved no more availing in discovering its nature. In all likelihood the malady was a form of that protean epizoöty—'influenza.'

[2] *Wirth.* Op. cit., p. 362.

[3] *Scheucher.* Naturgesch. des Schweizerlandes.

[4] *Chamberlain.* History of London.

all cattle were infected with a tumour in the extremities (*tumorem partium extremarum*), accompanied with emaciation and intense debility. The "serum" of the blood being very impure, also caused a tumour on the tongue which was intensely hot, and there was a great loss of saliva, and even a sloughing of some parts of the organ. The disease disappeared in time from prescribed remedies. . . . The same disease, arising from impurity of the "serum," affected many young men, by wasting away their strength with malignant catarrh.'[1] Epidemic influenza in England. 'In April horses had dangerous coughs.' 'July 8th, a most memorable excessive hot day; many horses died on the road.'[2]

A.D. 1708. A comet appeared, and there were volcanic eruptions. During the spring-time and the summer the above *aphthongular* malady (aphthous fever) raged in Silesia and in Poland.[3] Great mortality among the horses of the armies on the Rhine. Plague in man at Dantzic, and in the city of Seville the previous year. Immense crowds of insects, especially spiders, were observed, previous to the occurrence of pestilence. Influenza in man was general in Europe and America. In Hungary and in Transylvania, a disease of a carbuncular nature amongst animals. Ansfeld, a physician, asserts that a black cloud having obscured the sky and filled the air with a foul odour, all animals—cattle, horses, pigs, dogs, wolves, hares, and foxes—died soon after in great numbers.[4] In November universal catarrh in Europe, followed by an epizoöty in horned cattle and horses, especially in Holland.[5] In Ireland, Sir Thomas Molyneux gives an account of an 'universal cold that appeared in 1708, and was immediately preceded by a very sudden transition of atmospheric temperature from heat to cold, in Dublin and its vicinity.'[6] Rutty says that the frost lasted 'about nine weeks,' and that about that period there was 'another great *Rot* among the sheep here (Dublin).'[7] Rabies was epizoötic amongst dogs in Suabia.[8]

A.D. 1709. In the whole of Europe a most severe winter,

[1] *Steurlin.* Ephem. Nat. Curios., p. 156. [2] *T. Short.* Op. cit., 435.
[3] *Kanold.* Op. cit, p. 9. [4] *Loigk.* History of the Pest, pp. 358, 421, 437.
[5] *Webster.* Op. cit. [6] Memoirs.
[7] *Rutty.* Registry. [8] *Wirth.* Op. cit., p. 236.

and in the spring wide-spread inundations, causing a great famine and destruction among men, cattle, birds, and other animals. Influenza in man in Dublin. In France and in Italy the olive trees were destroyed. Sologne and other countries were visited by scorbutic disease and gangrenous ergotism, a fourth part of the rye crop having been infected with the ergot or spur. A most unfavourable summer in England, the crops suffering very much, and the wheat generally on the N.E. side of the furrows being destroyed. In Dantzic, an epidemy of a very serious character. Previous to its appearance, 'crows, daws, sparrows, and other birds, which at other times are to be seen in the town and about the gardens in vast numbers, were all fled, and none of them were to be seen until November; the same was likewise observed of the storks and swallows.' None were to be seen for four months.[1] In France and in Suabia, heavy mortality amongst animals, and a pustular epizoöty destroyed nearly all the fish in the lake of Zurich.[2] In Russia and in Asia, locusts committed great depredations. Kanold asserts that the dreaded epizoöty of contagious typhus (Cattle Plague, Rinderpest, Pestilentz des Viehs) had commenced its ravages in Russia. He says of the weather, in writing from Dantzic to J. Kanold at Breslau: 'We have now so strong a frost that the like has not been seen for twenty or thirty years. It has already lasted fourteen days. As a consequence, the pestilence in Thorn, as also in Graudenz, has subsided; yet the misery is great, for the cold presses hard upon the poor, and many men are frozen to death in the open streets. Cattle and birds die from the frost, and many rivers are entirely frozen. Thence arises much distress, especially as grain is very dear. As in Poland, the pest arose solely and alone from the great need of the people, who were obliged to live upon roots, bark, &c. I much fear this evil will extend itself.'[3] And elsewhere he states: 'The contagion of the plague (in man) is the most cruel of all, and from the year 1709, which year had already struck terror into every one from the fearful cold accompanying its commencement, the two fear-

[1] Philosophical Transactions, No. 337, p. 101.
[2] *Hartmann.* Helvetische Ichthyologie, 1827.
[3] Sendschriben von der Peste in Dantzig, p. 4.

ful inundations which followed the cold, as well as from the alarming spread of the human pestilence, we had still to learn that it could strike yet greater terror through an unusual epizoöty in cattle. The first beginning or appearance of the disease in Europe, arose in that part of Tartary which lies on the borders of Asia; but whether it was originally generated in this corner of Europe, or whether it was brought thence from Asia, or yet whether perhaps it was an endemic disease, as the plague of man is in Turkey and Egypt, I am unable to decide with so much certainty. I content myself in remarking upon the commencement of this epizoöty in the year 1709, in the above-mentioned neighbourhoods. Although the accounts written at the time, and from these places, were very sparing, especially as to the numbers of those attacked by this disease, yet it seems that it appeared first in Astrakan, on the banks of the Don, or Tanais, and the Volga; from thence it spread to Kazan, in Lesser Tartary, and even to Moscow, when it caused great ravages in these governments among the horned and horse stock, but principally the former. From the symptoms of the disease itself, one learns at the time nothing, except that from the very first attack it was highly contagious; that it affected large numbers of cattle, and that very suddenly, killing them almost at once; and that it spread itself quickly in many neighbourhoods. So well marked were its characteristics, that its progress was easily noted. It extended itself steadily, but uniformly, over many kingdoms and lands during many years, even notwithstanding the best care and tending, until at last in later times, and in enlightened countries, attention was directed to the study of its nature and symptoms.'[1]

A.D. 1710. The weather was generally fine and apparently healthy. Dr Short, however, says that in October and November great floods prevailed, that the winds were very variable, but mostly south, and that 'the air was foggy, thick, moist, vapid, often stagnant, long without sun, and very unhealthy in Carniola and Augsburg.'[2] Sweating sickness in man at Copenhagen and in Sweden, and pestilence in Lithuania. Earthquake at Stettin.

[1] *Kanold.* Jahreshistorie, p. 17.

[2] *Dr Short.* Op. cit.

Russia was ravaged by the Tartars. Swarms of locusts in the Ukraine, Podolia, Kiev, Pioly, Kaminietz, Buczinow, Gallicia, Wallachia, and Hungary.[1] They also appeared in Saxony, in August. In Transylvania, animals suffered equally with man from plague. 'Dogs especially were driven to madness; they made a noise with their mouths, and were gasping with the heat like owls. They were marked on the body with carbuncles. On the pigs which succumbed to this disease, huge tumours and hard scabs of a carbuncular nature were observed behind their ears. Swarms of locusts intercepted the rays of the sun, so that a bird could scarcely fly horizontally. There was, also, so large a mass of worms, caterpillars, toads, and such like things, that all food in the shape of vegetables was unpleasant and injurious to man.'[2] The contagious typhus of cattle (Cattle Plague) was spreading onwards in Russia, in the governments of Riazan, Worotin, and Moscow. In the autumn it had got as far into the Ukraine as Kiev and Tcherkasi, and was extending in Volhynia, Podolia, and Transylvania. Cattle, above all other animals, suffered from it, but also often enough the horses.[3] This is undoubtedly a similar mistake to that made by some zealous but imperfectly informed people, when the same disease appeared among cattle in England in 1865. Horses and other solipeds—indeed, all animals except ruminants, are exempted from it. Kanold, the author of this statement, imagined the disease was caused by the locusts.

A.D. 1711. Swarms of locusts in Southern Russia and in the kingdom of Naples. Disease in birds and fishes.[4] Towards the end of the year a deadly epizoöty appeared among horses in Naples. It continued until the following year, in which it will be more fully noticed.

The contagious typhus of cattle spread this year from Russia, by way of Poland, into Prussia, Brandenburg, and Silesia; from Hungary into Austria, Bavaria, and Suabia; from Dalmatia into Italy; and from Russia into Moldavia and Wallachia. It

[1] *Kanold.* Op. cit., p. 27. [2] *Loigk.* Hist. Pest., p. 359.
[3] *Kanold.* Jahreshistorie, p. 25.
[4] Ibid. Histor. Relationen von der Pestilentz des Hornviehs. Breslau, 1714, p. 43.

found its way through the governments of Moscow, Riazan, Worotin, Ukraine, Podolia, and Volhynia; and from these countries travelled into the provinces of Polesia, Lithuania, Sendomir, Lublin, Cracow, Siradin, Kalisch, Posen, Masovie, and entered Prussia, where, in the month of October, it had got as far as the neighbourhood of Königsberg; on the other side, it penetrated from Poland into Silesia, from whence it became diffused in the vicinity of Bojanowa, Medzibor, Ohlau, Brieg, and Breslau. *It only spread by contagion,* and Kanold says that whatever course it pursued, 'notwithstanding the lateness of the season, they who had two or three herds of stock upon their lands could scarce keep a single animal, and large numbers of cattle were found lying dead upon the roads.'[1]

From Hungary it was carried into Carinthia, Styria, Austria, and as far as Augsburg in Bavaria. Gerbezius, writing on the 28th of December from Laybach to Augsburg, says: 'Animals also continued to die. It is certain that so many showers, accompanied with rust (blight), had made the pastures very unhealthy; and yet it is more probable that the continuation of the mortality is rather to be attributed to the spreading of the contagion which was brought among them, than to the unhealthy pastures.'[2] And writing on the 12th of January, 1712, to Fabæus at Vienna, he adds, 'You make mention of that disease by which nearly all the oxen, cows, and calves have been killed about you; know, then, that there has been a like mortality among the same animals with us, except that hitherto it has not extended so far, but has remained on each side of the Royal road (*regia via*), along which Hungarian cattle are driven from Styria into Italy; on that tract nearly all have perished; and as with you, no trustworthy remedy can be found which will prove satisfactory. Every one agrees that the cause of this disease arises from infected cattle being driven from Hungary into Italy; but whence it was originally derived there are many differences of opinion. But if we take into consideration the warm and rainy character of the end of last summer, and the whole of the autumn, we may easily perceive that the infection was

[1] *Kanold.* Jahreshistorie, p. 33.
[2] Ephem. Nat. Curios. Appendix, p. 36.

derived from the corrupt state of the pasture lands from the excessive rains; and besides this, to the putridity occasioned by the numbers of dead locusts and cicadæ that were about at the end of the summer and beginning of the autumn of 1710. They say that the State of Carniola avoided the plague through prohibiting, by public edicts, the admission of pigs from Croatia, because there might have been mixed with the acorns they ate in the oak forests thereabouts, some of the locusts which completely covered the ground around Sagratia, and the vicinity of Hungary and Croatia. It was also remarked with us that dogs, and some say crows, which fed on the diseased flesh, immediately died.'[1]

According to Schroeckius, it manifested itself at Augsburg towards the end of the summer of 1711. 'About the end of the summer and throughout the autumn, that plague which had been so destructive to the bovine race in Germany and Italy, after it had proceeded by degrees from Hungary towards the Danube, attacked our territory and produced great destruction to beasts, sometimes destroying whole herds amongst us, and in many neighbouring places. And this was not caused by any foulness in the atmosphere, but by the contagion of oxen brought from the infected countries; and this was patent, because it first attacked those pastures adjoining the foreigners, and altogether spared those cattle to which no infected animals had approached, and which had been immediately separated from any in the same herd that were infected.'[2] He termed it a 'malignant dysentery.' 'The saliva that the diseased beasts dropped in the pastures infected them, and thus communicated the malady to those cattle which afterwards grazed thereon. It appeared certain that this acrid matter passed by way of the mouth, œsophagus, the stomachs, and the bowels, and, in infecting these, caused an irritation which was soon communicated to the nerves, from whence arose the spasmodic movements. The constriction of the vessels which followed, induced congestions and inflammations, and converted the whole body into a corrupt mass. In

[1] *Gerbezii.* Chronologia Medico-practica. Frankfort, 1713, p. 203.

[2] *Schroëckii.* Constitutio Epidemica, Ephem. Nat. Curios. Appendix, p. 23.

some the tongue was inflamed and covered with red vesicles; the excretions were sanguinolent, as in malignant dysentery. The principal symptom of the disease, at the commencement, was a difficulty in breathing and a higher temperature than in health. The intestines, near the liver, were found after death covered with bile, and the stomachs inflamed.' Schroeckius designated it a malignant dysentery—a name which gave it a widely different signification from those given it by other writers of the period. This diversity of opinions, says Paulet, on the denomination of a disease, proves how difficult it is to characterize it sufficiently.

The disease spread from Russia and from Hungary, into Moldavia, Wallachia, Sclavonia, Istria, and Dalmatia.[1] As has been already noticed, this fearfully contagious malady was conveyed from Hungary into Friuli, in Italy; but its history is best told when the infection had been introduced into the province of Padua. On the 27th of August, 1711, a drove of infected cattle from Hungary, sent through the agency of Dalmatian merchants, and which had been disembarked at Venice, passed through the village of Sermeola, about two leagues distant from Padua; and one of these beasts, straying from the others, was taken to a farm named Pampagnini, belonging to the brothers Borromeo, where it was put into one of the cow-houses. In about eight days the whole of the cattle on this farm became ill, and soon all died, with the exception of one, which had been treated by a seton in the neck. The disease soon spread into the neighbouring districts, and it was believed, and the public records sanctioned this belief, that this Hungarian ox had conveyed the germs of the pestilence.[2] Though Lancisi mentions this fact, and although it has been recognized by many authors as the only source of the epizoöty in the whole of Italy, yet a comparison of the preceding observations will show that it had many other sources. Already, in this year, it had cruelly devastated the whole of the Venetian territory, had scourged Mantua, Brescia, Pavia, Voghera, Tortona, Alessandria, Parma, and Genoa, and had even reached Switzerland and the kingdom of Naples. Nevertheless,

[1] *Kanold.* Op. cit., pp. 51—53.

[2] Epistola de *Padre Borromeo*, Teatino, scritta ad un suo amico (*Lancisi*). Rome, 15th Dec. 1711. Naples, 1712.

there can be no doubt as to the correctness of the opinion which attached suspicion to the Hungarian cattle. For many centuries, the herds of Venice and Lombardy have suffered from invasions of the Cattle Plague, through the commerce in foreign cattle across the Adriatic, as this history testifies. Dalmatian cattle-dealers are frequently mentioned in connection with the advent of this scourge—these men being engaged in carrying oxen to Italy from a country which, from the earliest times, has borne the unenviable reputation of harbouring the contagion. And to this source may we not ascribe the many outbreaks of ovine variola which have decimated the flocks of Venice and Lombardy?

Many excellent authorities testify to the progressive inroad of this most remarkable and deadly epizoöty, and there was no lack of close observers; but of all these, the best were, perhaps, Lancisi and Ramazzini—two physicians who gave the malady their utmost attention. Ramazzini, who gives the most classical description, describes it as follows: 'It is evident that this disease, which has created such dreadful havoc among the whole bovine race, from its cold shiverings, followed by excessive heat throughout the whole body, is a malignant and deadly fever, as its accompanying symptoms testify. In the first place, there is intense anguish, heavy breathing and continued snorting (or groaning) accompanied by fever, stupor, and slothfulness or weariness; a continued running of ill-odoured matter from the mouth and nostrils is observed, and most fœtid excrement, sometimes mixed with blood, is passed; there is loss of appetite, and chewing the cud (rumination) ceases. On the fifth and sixth days, pustules break out over the whole body, and tubercles of a variolous character. On the fifth or seventh day, death ensues, which very few escape, and those more by chance than from the effects of remedies. We may reasonably suppose that the miserable oxen suffer much internal pain, when they lie groaning, or while they stand motionless with heads cast down towards the ground; but from dumb animals, who can make no signs, it is impossible to say for certain what is the ailment in their case, and therefore remedies are difficult to find. In the carcases of as many oxen as were dissected by the eminent professors Molinetto and Viscardo, it

was noticed in all, strange to say, that the omasum was hard and compact, and the leaves closely adherent; while all were of great size and emitted a horrid stench. In other parts, such as the brain and lungs, hydatids were found, enclosed in huge bladders as if full of wind; these, when dissected, exhaled a noxious effluvium. The tongue was covered with ulcers towards the root, and full of little vesicles on its sides. I know for certain, that that portion of the body which was observed in the abdomen (the stomach) to be hard and compact like stone, was primarily produced by a contagious miasma, which, while pursuing its own course of destruction, weakened and corrupted the gastric juice (*illud verò corpus durum et compactum ad instar calcis quod in omaso observatur, primum productum esse contagiosi miasmatis pro certo habeo, dum tacite sævitiam suam exercens, stomachicum fermentum labefactat et corrumpit.*) . . . It might reasonably be expected that mankind would be left uninjured; for if, in the space of three months, the plague had attacked no other ruminating and horned animal, or in any way injured horses, pigs, or wild creatures, there is no reason why it should affect men, who are so different from these creatures.' [1]

Ramazzini and other physicians were of opinion that the disease was similar to, or identical with, small-pox in man; and this opinion was discussed and controverted in a circular issued by the Philosophical College of Padua, on the 28th of October, 1711.

This bulletin goes on to say: 'We have seen the effects of the disease to be most frequently in the viscera already described; that is to say, in the first ventricle or omasum (*primo ventricolo, detto Omaso:* this is an error, as the "omasum" is the third compartment of the ox's stomach), where one sees dryness, hardness, and contraction towards the middle, with a collection of alimentary substances rendered hard and stony; the second ventricle (*secondo ventricolo*) is found extremely full of food (*escrementi*), with an abundance of fetid gas. . . . . The following organic changes are found in the viscera, with few exceptions: we see the lungs evidently inflamed, as well as the neighbouring

[1] *Ramazzini.* Diss. de Contagiosa Epidemia quæ in Patavino agro in Boves irrepsit. Geneva, 1711.

parts; but at other times only the bronchial glands, tonsils, and adjoining textures, as well as the muscles of the œsophagus and larynx; the morbid appearances often extending to the tongue in a great number of cattle as a deep and somewhat transverse fissure, sometimes involving the whole organ; these fissures, as the disease progresses, become foul callous ulcers. Besides these various morbid characteristics, other rare (or inconstant) appearances are observed, such as suppurating tumours showing themselves in the glands of the throat, and abscesses in the lungs and liver; at other times, a number of small tumours arise upon the skin covering the body, which neither suppurate nor change colour, but slowly disappear or remain until the death of the animal. From this last and rare circumstance, it has been the opinion of some that this affection should be universally designated "variola bovina;" to which disease, however, many high authorities thought oxen were not liable. But yet, if this be the case, as might be suspected, how is it that, in so general a disease as this variola is, so small a number exhibit the morbid eruption on the skin? Nor does variola usually make such great slaughter of the sick, nor yet is it so general or so rapid in its course. Besides, in what other cutaneous affection was so rarely seen a simple elevation of the skin, except in the human morbilli? or some hard and badly suppurating tumours unequally raised on one or more parts of the body?'[1] The writer who drew up this report was Marco Novara, professor of practical medicine at Patavia.

In this year, or the preceding, the small-pox of sheep is supposed to have appeared in England for the first time,—though erroneously, if the student will refer to the year 1277. Dr Fuller, in his work on Eruptive Fevers, says: 'There was, about the year 1710 or 1711, upon the South Downs in Sussex, a certain fever raging epidemically among the sheep which the shepherds called the small-pox; and truly, in most things, it nearly resembled it. It began with a burning heat and unquenchable thirst; it broke out in fiery pustules all the body over. These

[1] *Bottani.* Op. cit., vol. vi. p. 98. Dr Michelotti, who was in the Venetian territories in October, 1711, gives an excellent description of the malady; a translation will be found in the Philosophical Transactions, No. 365, p. 83.

pustules maturated, and, if death happened not first, dried up into scabs about the twelfth day.

'It could not be cured, no, nor in the least mitigated, by phlebotomy, drinks, or any medicines or methods they could invent or hear of. It was exceedingly contagious and mortal, for when it came it swept away almost whole flocks; but yet it could in nowise be accounted the same with our human small-pox, because it never affected mankind.'[1]

A.D. 1712. Winter cloudy; much snow. Summer damp. Inundations in various countries. Earthquakes, and a great eruption of Vesuvius, lasting from February until July. Epidemic miliary or sweating pestilence at Mümpelgart, and catarrhal fever or influenza in various places. In Hungary many insects and venomous reptiles. 'In the months of June and July there was intense heat, accompanied by swarms of insects, snakes, and reptiles, which especially attacked the country people. The whole of the body of one who had been bitten was immediately impregnated with a poison of a sulphureo-saline nature, and swelled throughout, beginning with the tongue, and to such a degree that articulation was impossible. There was also acute head-ache. Cattle, too, were attacked by them, and great mor-

[1] *Thomas Fuller*, M.D. Exanthematologia, or an Account of Eruptive Fevers, especially the Measles and Small-pox. London, 1730. A Mr Hall, who lived about the middle of the last century, and who published a work on agriculture (*The Gentleman Farmer*), mentions a disease somewhat analogous to sheep small-pox; but as unfortunately I am not now in a position to be able to refer to the book, I will quote what Dr Paulet says in his Treatise on Epizoöties, published in 1775, when speaking of what he terms the 'crystalline disease' of sheep: 'We ought to distinguish clearly between the hydatids which accompany the rot and a crystalline eruption to which sheep are liable, particularly in England. It begins at first, according to Mr Hall (see *Le Gentilhomme Cultivateur*, tome x. chap. xxxi.), by an inflammation of the skin around the chest and the belly, from whence it extends to the other parts. This inflammation is always accompanied by blisters (*cloches*) which contain an acrid blood-coloured fluid. The disease is very contagious; and if the affected sheep are not separated from the healthy ones, the whole flock runs the risk of being infected. This is, perhaps, the disease which the ancients termed *pusula*. It is necessary to change the water and the pasture. The best means of treating it consists in taking two drachms of sulphur, half an ounce of honey mixed up in half a pint of nettle-juice, and giving this to the sick sheep every day for two weeks. The blisters must be opened in order to allow the humour to escape, and the wounds washed with the juice of wormwood. The fourth day, the sheep must be bled.' Vol. ii. p. 287.

tality ensued. Many of the men to whom remedies were not immediately applied on the first day, died from the poison. It was worthy of remark, that at certain hours the water was fœtid and red, and after some days regained its limpid character. When chemically examined, a kind of red earth was found in the water, mixed with nitrous particles, but the stench was attributed to a bituminous viscid matter.'[1]

Anthrax also appeared in Hungary, and an epizoöty of rabies amongst the deer tribe. 'August being excessively wet, the mortality among cattle increased, and they were seized with a white pustular eruption (*pustulis albicantibus*), attended with difficulty of breathing. When the pustules were opened, a purulent matter with a noxious exhalation was discharged, as well as an intolerable stench from the mouth. The animals groaned loudly from the intense pain. Wild beasts of all kinds perished in large numbers at Somogy; and in the woods the country people found dogs which had been driven there by madness after feeding on these beasts; and men bitten by them were quickly seized with frenzy and hydrophobia, imitating the barking and the madness of dogs, and attacking those near by biting at them. Some even contracted the madness while trying the remedy of washing the mouths of the beasts with vinegar and salt.'[2]

In Lower Hungary, there was an extraordinary mortality amongst the wild hogs. They died in such great numbers, and their putrefying bodies were such a nuisance, that an order was issued for their interment.[3]

An epizoöty of anthrax in France;[4] also in the neighbourhood of Augsburg, which was imagined to be derived from Hungary. Schroeckius writes: 'The grievous plague must not be overlooked, which seized and killed many horses, mostly without the city, and afterwards did not spare the oxen, pigs, geese, fowls, or even the wild beasts, while it lasted up to July. Hard tumours appeared on the breast and groin, and other places, and they so quickly spread themselves in all directions, that in a short space of time death ensued. It seems to me that this arose from the

[1] *Gensellii.* Constit. Epid. Infer. Hungariæ. Eph. Nat. Curios., App. p. 4.
[2] Ibid. p. 4. [3] *Kanold.* Op. cit., p. 104. [4] *Paulet.* Op. cit., vol. i. p. 93.

stings of hornets, which were observed in incredible numbers and of unwonted size. It is not very wonderful, then, that, as the dead bodies of the oxen that had died the previous year were nowhere buried sufficiently deep, and had become putrid and fit food for these insects, they should in this way have generated and increased the virulency of the poisoned humours. Thus these poisonous atoms in the humours of animals stung by them, multiplied themselves, and were then able to infect other animals. As an example of this, there was a horse belonging to a baron kept in a stable in the vicinity of some animals that had died of this malady, and were not buried sufficiently deep, so that one foot protruded through the ground. This was cut off with an axe by a servant, and while he was doing so some matter flew up into his eye. This soon caused swelling and inflammation, which quickly spread to the other eye and over the whole head, and as the poor man was without medical aid, he shortly died.'[1]

With regard to the French epizoöty, M. Herment states: 'In many provinces, it is observed that the horses and cattle are attacked by a kind of farcied tumour, about the size of a nut, which appears about the flanks and gradually increases, communicating with the scrotum, which becomes prodigiously swollen. The vessels in the neighbourhood are so engorged, that they become like cords. The tumour is hard, black, and does not contain pus, resembling in this respect the anthracoid swellings which often manifest themselves in man during the progress of

[1] *Schroeckii.* Constit. Epid. Eph. Nat. Curios., App. 27. Professor Gamgee, in his Treatise on the Diseases of the Domestic Animals, gives us a perhaps more striking illustration than this of Schroeckius, of the potency of the carbuncular poison. He says: 'I have seen various forms of anthrax in the marshy plains of the Papal States during the summer months, especially in July, August, and September. The activity of the developed poison was very great, and one instance more particularly struck me. One of the fine white bullocks of the Roman States was conveyed in a cart to the slaughter-house at Ferrara, in the month of August, 1854. Professor Maffei condemned the animal as being affected with carbuncular fever. The animal was buried; but a jobber determined to sell the flesh, and during the night disinterred the carcase. He removed the meat in bags to a hiding-place, and in doing so carried the bags over his shoulders. He had thrown off his jacket and set to work in his shirt. Next morning, a diffuse erysipelatous inflammation set up over the back, notwithstanding that no abrasion of the skin could be detected, and the juice of the flesh had had to permeate through the bags and shirt. In three days the man was a corpse.' P. 283.

contagious diseases. When this tumour, which the peasants call *'charbon,* shows itself on the breast or about the head, the animals die so quickly, that there is scarcely time to aid them. When the swelling is accompanied by considerable fever and beating of the flanks, it is necessary to begin the treatment by bleeding, and soon afterwards by opening the tumour, wherever it may be, by incisions in the form of a St Andrew's cross, washing the wound with salt water or with brandy,' &c.[1]

In Lower Hungary, an epizoöty of small-pox in sheep, described by Adam Gensel, destroyed whole flocks.

A severe epizoöty among horses manifested itself over nearly the whole of Europe, frequently in different places appearing at the same time as the so-called contagious typhus of cattle; at other times, and in other localities, breaking out before or after that disease. This affection among horses prevailed in Russia, Lithuania, Podolia, Volhynia, Prussia, Pomerania, Brandenburg, Moldavia, and Wallachia.[2] At the same time it raged over nearly the whole of Germany, in Belgium, the north of France, and in Italy,—especially, it would appear, in the environs of Naples and Rome. Army horses suffered very much. Kanold describes it as it appeared in Germany: 'But I must not here forget to mention that in many countries and neighbourhoods cattle were not the only animals affected: principally, and in some instances alone, horses were attacked and died in large numbers; for the same sickness could be traced from July, and sometimes even from May, till the winter, in Pomerania, in Brandenburg, in Saxony, in Franconia, Suabia, Mecklenburg, Hanover, Holstein, but especially in Trittow, Rheinbeck, and Eutin; so that often, in many villages, two or three horses alone escaped. In Brandenburg and Mecklenburg it attained its greatest severity in July and August, but after October it began to decline. Further, it ravaged the various neighbourhoods of the Upper Rhine, in Alsace, the horses in both armies, and especially Landau, Germersheim, Philipsburg, and elsewhere. Also on the Lower Rhine, particularly in the

[1] *M. Herment.* Remèdes pour Preserver et Guérir les Chevaux et les Bestiaux. Geneva, 1716.

[2] *Kanold.* Jahreshistorie, p. 94.

Cologne district, where no less than in Luxemburg, in Brabant, and Artois, in the armies a troop could scarcely muster a dozen effective horses. Also in Picardy, and other places on the borders of France and Germany, it did much damage; and it caused a great mortality among the horses in Lithuania, Poland, Prussia, Hungary, Moldavia, Wallachia, and far into the interior of Turkey.'[1]

Lancisi describes it as it appeared at Rome: 'A disease of this kind sprung up amongst us at the commencement of the month of March. There had been a most grievous mortality among the herds of oxen at Padua, and afterwards among the horses in the stables at Naples, especially in the months of January and February; so much so, that out of every ten horses seized by the plague at Rome, scarcely one survived. At the end of June of the same year, 1712, by the grace of God, the epidemic among the horses at Rome ceased, the contagion being checked within the city and its environs. Judging from those which had been attacked, it was clearly evident that the epidemic was of two kinds—both of which, however, arose from the same ill disposition of the blood; in the one case the circulation being too languid, and in the other too rapid. The too rapid circulation differed in no way from an acute fever, which at first produced cold shiverings over the whole body, accompanied by loss of appetite and constipation, and, as a consequence, colic severely affected them. At length inflammation set in, especially of the whole intestines—omentum, bowels, and stomach. This was found to be the case on post-mortem examinations of some of the bodies. This kind of disease, although the least frequent, was more severe and fatal than the other, for it quickly polluted the whole body as if by contagion, and in two days the animals died.

'But the second kind, which was less grievous in its results, oppressed us most heavily, so that it might with justice be called *the* epidemic. The horse at first refuses food and drink, hangs its head low and averted, while the eyes are dull and seemingly vacant. The jaws are not closed, but are observed to be protruded and more rigid than usual to the very top of the wind-

[1] *Kanold.* Jahreshistorie, pp. 94, 119.

pipe, though without any symptom of pain. In this condition, if any one continues to exhaust or fatigue a horse whose health is impaired by neglect, as is sometimes the case, the disease immediately increases. Acute fever and anguish ensue, there is a discharge from the nostrils, and the throat soon begins to swell. Others become sluggish and thrust out their tongues, which are coloured with a yellowish tint; then there arises shivering and convulsions of the body and staring of the coat, retention of urine, and cold sweats; those so affected for the most part die. On the other hand, those recover, when, from their mouths and nostrils there is a more copious discharge, and who give vent to a large flow of ill-odoured urine, or who have swellings on the limbs or joints. . . . . As regards the origin of the disease, all are agreed that the internal and chief cause of the epidemic was the fact of the blood abounding in over-stimulating or lymphatic particles; for on the surface of the blood taken from the veins, a portion became of a whitish-yellow colour, and of the nature of lard. Besides this, there was the mucus discharge from the nostrils, both by natural and artificial means, and which marked the disease. Lastly, dissection of the dead bodies showed hard substances of a polypoid nature in the heart and about the pericardium, and even in the windpipe and œsophagus, which most clearly indicated that lymph itself, which usually has the power of adding solidity to the textures, makes the disease more intense than the variety of the parts affected would warrant us in supposing. We attribute the external cause of this calamity to the impurity of the atmosphere, thinking, as we do, that in this year the air was full of noxious liquid particles which adhered to the bodies of the horses; and we are led to this opinion because the plague attacked the whole equine race without distinction, and in so large a city there must have been a great dissimilarity in the food and water; moreover, nothing could be found to check the epidemic. As regards contagion, all are of opinion, and rightly so, that the disease was not carried in the breath or exhalations; for, generally speaking, it was not those in neighbouring stables to the infected that were attacked.'[1]

[1] *Lancisii.* De Equorum Epidemia, quæ Romæ Grassata est vere. Rome, 1715.

The treatment consisted in bleeding, but only in the feverish or hot stage, because in the cold one it was found to be hurtful. In the latter stage, treacle and *cordials* were given, and gruel of barley or bran, with sal-ammoniac dissolved therein. The liver of antimony, and those drugs which induced salivation, were the favourite medicines. Emollient enemas were much lauded. Vesicants were not much used, but setons were thought to be beneficial. Frictions with the hands, often and long-continued, were deemed of most service. If the disease extended to the articulations, it formed swellings, which condition Lancisi, following Vegetius, denominated the *malis arthritica*, as he fancied it to be the same disease as the *malis* of the Greeks. This extension, or transference, of the malady to the limbs, he indicates as a favourable symptom. The disease, with careful treatment, was not a fatal one; indeed, this author says that all the horses might have been saved.

Though in one part of his treatise he thinks it was not a contagious disease, yet in another he believes that the saliva of an affected horse might communicate it to a healthy one. The Italian hippiatrists termed it the 'epidemic fever of horses,' but we have no difficulty, I think, in distinguishing an epizoöty of the protean equine disease, 'influenza.' The way in which they induced salivation was to fix a bit in the horse's mouth around which was wrapped in linen a quantity of assa-fœtida, and a like quantity of laurel-leaves, all mixed up with vinegar.

Kanold, strangely confounding many diseases with the contagious typhus of cattle, and believing that it might be communicated to horses, is yet strongly of opinion that at least in Holstein, Alsace, Artois, and other places, the horse disease was not contagious, that it could not be transmitted to cattle, and that it was not propagated like the virulent malady of these animals, but that it ceased suddenly in the winter of 1712-13.[1]

The Cattle Plague, in the mean time, still raged in Russia, Poland, Silesia, and Turkey, attacking one place after another in those countries it had missed in the preceding year.[2] In Silesia alone, Kanold computed that 100,000 head of cattle had per-

[1] *Kanold.* Op. cit., p. 124.

[2] Ibid. Jahreshistorie, p. 124.

ished.[1] It spread into Moravia, Austria, Styria, and the Tyrol, and it even invaded Switzerland.[2] In Italy its ravages were dreadfully severe. 'At the end of the preceding year, a ruinous mortality among cattle had penetrated from Hungary into Italy:—a scourge which all who witnessed it thought the most disastrous event that had ever befallen mankind. This year it spread itself widely in the State of Milan—to wit, Verona, Brescia, and Mantua—causing a horrid slaughter of these essential animals. The same happened in the kingdom of Naples and in the States of the Church, in which immense damage was inflicted during the month of September. In that month, it has been estimated that 70,000 head of oxen and cows perished; and in Cremona alone, there died more than 40,000. The pestilence made terrible havoc in this vicinity.'[3] In Germany it was still spreading, and having penetrated Saxony the year before, it now diffused its subtle poison in Thuringia, spread wider and wider in Bavaria and Saxony, and at last wandered into Franconia, where it harassed the districts of Anspach, Neubourg, Bamberg, and Wurzburg, as far as Fulda.[4]

A.D. 1713. In Hungary, the year was wet. Many swarms of mice appeared in that country, in France, and in Saxony, where the weather was excessively dry. Insects destroyed the vines. In Russia, Poland, and Italy, multitudes of grasshoppers. Small-pox in man at Constantinople, where inoculation was practised. An *epidemy* (the plague) was very fatal in Austria.

Altogether the year was a very unpropitious one for animal life. At Basle, the fowls and geese and the deer tribe died in great numbers. Hares, wolves, and foxes were also found dead in large quantities. In Poland, the mortality was very great among moorfowl; and in Silesia and Alsace, deer suffered much. In Hungary, hares, foxes, and wild hogs perished from a disease resembling, or identical with, rot in sheep.[5] In the country of

[1] *Kanold.* Histor. Relationen, chap. ii.

[2] *Walzer.* Appenzeller. Chronik. p. 715.

[3] *Muratori.* Annali d'Italia, vol. xvi. p. 412.

[4] *Nottelmann.* Vorstellung was die jetzt herumvagirende Seuche sei. Nürnberg, 1713. *Romeisens.* Untersuchung der jetzt wüthenden Viehseuche. Würzburg, 1713.

[5] *Kanold.* Jahreshistorie, p. 184.

Kaskow, Hungary, an epizoöty raged among cats during the spring, and so deadly was it, that in many villages not one of these creatures remained alive, and the peasantry complained very much of the mischief done by the increasing swarms of mice, in consequence of their destroyers dying.[1]

Sheep, of all other kinds of animals, perhaps perished in largest numbers. In some places where this happened, the disease, from some accounts, was *rot*, and from others it was supposed to be small-pox. In the upper part of the kingdom of Naples the malady was so severe, that in a short time 50,000 sheep and pigs perished—showing, too, that the porcine tribe was affected. The disastrous epizoöty also visited the sheep and goats in Poland, Prussia, Silesia (where on six farms alone there succumbed 1470 animals), and appeared in Saxony, Franconia, Bavaria, Suabia, Austria, Hungary, France, and Holland. Kanold describes it as follows:—'The sheep began to tremble, and became so weak that they immediately lay down, and seldom got up again. Yet usually they continued to eat, sometimes with avidity, but still they did not recover their strength. They convulsively jerked the head and neck upwards, which was generally a very dangerous sign. The ewes in lamb aborted, and those which reached the full time of gestation had flaccid udders and were deficient in milk, and the lambs were very weak. The wool, which previously was of a fine white, became of a blackish colour, as if it had been strewed over with black dust. The symptoms generally continued until the fourth day, and sometimes even to the eighth day, when they died. On examining the bodies after death, much external dropsy was observed, and this often occurred in the internal cavities; the abdominal viscera were frequently found inflamed, the gall-bladder was in some large, in others small; the lungs and liver were, generally speaking, diseased, and in the majority of cases gangrenous; the heart was flaccid and wasted. I have been positively assured that the disease was so contagious, that the shepherds have carried the infection in their clothes from the unhealthy to the healthy.'[2]

He adds, that though contagious, it was not nearly so much

[1] *Loigk.* Histor. Pestis, v. 437.

[2] *Kanold.* Op. cit., 175.

so, nor yet so prevalent, as the Cattle Plague; in fact, he clings to the opinion that the disease was not the same as that then affecting the bovine species, nor was it caused by that malady. Some believed that this complaint in sheep was induced by the mice, but Kanold says: 'In the mean while, it appears that the above visitation of mice was not the real cause of the disease in sheep; but that both were brought about by the unusual sultriness and humidity of the weather.'[1] There can scarcely be a doubt, however, that this great mortality amongst the sheep and goats really originated from contact with the diseased cattle, and was produced by the same contagion.

According to Wirth, the epizoötic contagious pleuro-pneumonia of cattle was present in Switzerland. He says, 'Certain it is, that it (pleuro-pneumonia) manifested itself in the years 1713 and 1714 in Suabia, and also in several cantons of Switzerland.'[2]

The Cattle Plague continued its ravages in all the countries named in the preceding year. In Russia, it had enlarged its boundaries, and attacked the governments of Novgorod, Plaskow, Petersburg, and Ingermanland. In Germany, it was reported in Bresgau, Würtemburg, Baden, the valley of the Rhine, Pfalz, and Alsace. It was still spreading in Switzerland, but in Holland its violence was excessive, and it was said that there alone, from 1713 to 1723, it had destroyed 200,000 cattle. In Italy it was steadily marching on, and causing sad havoc in every place, with the exception of Piedmont. In the kingdom of Naples, in Calabria, and in the Romagna, its advances were causing the utmost apprehension and fear. The learned doctor and physician to Pope Clement XI., Giovanni Lancisi, was sent to investigate the nature, and prescribe measures for the suppression, of the murderous pest raging amongst the herds of the Romagna. To the ability displayed by this man, while obeying his instructions, we are much indebted for an accurate description of the symptoms and post-mortem appearances of the malady, as manifested in that part of the Roman dominions. His report is as follows: 'In the middle of the summer of 1713, there was a rumour at Rome that

[1] *Kanold.* Op. cit.

[2] Lehrbuch der Seuchen und ansteckenden Krankheiten der Hausthiere. Zürich, 1846, p. 298.

a large number of infected oxen, from the districts on the Mediterranean, were being driven from the market of Frusino to us; wherefore it was wisely decreed that no markets should be held, nor any cattle admitted into the place. But merchants introduced oxen into the city secretly by by-ways, because their hopes of selling them publicly had been frustrated; and these being driven about in all directions, and becoming mixed with our hitherto healthy stock, spread abroad the disease. For when any foreign merchants had doubtful or suspicious cattle they could not sell in their own country, they brought them to Rome surreptitiously, and sold them for less than the usual price. But the butchers of the city, who had not yet discovered the deceit practised upon them, were led to buy these animals at a reasonable rate, and in this way were immediately disseminated the germs of the hidden contagion. . . . . Every fact clearly shows that the cause of the plague is some exceedingly fine and pernicious particles (*corporis particulas, quæ summâ quidem tenuitate, et pernicitate præditæ*) which pass from one body to another, by contact, or by the means of fomites. It therefore resembles a special virulent poison; a few particles affecting the whole organism, and acting, in all likelihood, just as we see a ferment act in bread or wine, a minute portion leavening the entire mass. .

'The first symptoms of disease in some oxen we had under observation were timidity, bellowing, snorting, and other indications of sudden fright or agitation, as if some poison had affected their *mobile spirits*, causing spasms of their nervous fibres, and producing convulsions externally and internally. We also saw others, but a few only, which were naturally weak and destitute of stamina, die suddenly, as if struck with a thunderbolt. In general, however, the first symptoms of the plague were debility, sudden dulness, drooping of the head, tears flowing from the heavy eyes, and mucus and saliva from the nostrils and mouth. This was accompanied, in the mean while, by fever, with shivering and staring of the coat, nausea, and an inclination to lie down. There were always inflammations (*phlogoses*), pustules, hydatids, and ulcers on the tongue and mouth, accompanied by intense fever. In not a few there were scattered over the skin watery tubercles, and the hair fell off. At first they

suffered from excessive thirst, and drank greedily; afterwards they wholly abstained from food and water, and were unable to swallow or chew the cud. The want of sustenance caused death to take place more quickly than would have been the case from the nature of the disease. In the stomach lumbrici (worms) were very often found, and the dejections were very fetid, of various colours, and sometimes stained with bloody humours. Nearly all the cattle, at the later stages, were foul-smelling; their breathing was laborious and heavy; not unfrequently there was a cough, and within seven days they generally died. Those which reached another day (but they were very few) usually escaped, especially if the hair became rough and fell off; and if they could not easily arise from a recumbent position, it was usual to prevent their attempting to do so.

'It was proved by examination, that they continually suffered from affections of the bowels. This appeared most evident on three examinations which we held on the dead bodies of oxen, that had died of the disease; for besides ulcers in the mouth, fauces, œsophagus, stomach, and lungs, there were spots of a colour varying from red to livid or gangrenous, nearly the same in each animal; but the lesions in the intestines were not alike in all. For in the first ox which had perished on the third day, we found in the omasum (*omaso*) a hard mass of hay, and that ball which Pliny calls the *tophus* of young heifers, produced by licking off the hairs with their tongue and rapidly swallowing them, when, by the peristaltic motion, they were rolled up, and the saliva was obliged to pass through, as in a filter. The other intestines were in a fair, healthy state. In the second, which died on the sixth day, the liver, intestines, and lungs were completely mortified. In the third, the heart and brain were nearly corrupt. . . . And it is extremely wonderful that this deadly poison, which had destroyed the bovine race with such havoc in these years, was wholly innocuous to other animals. . . . It is also remarkable, that the seeds of the contagion were not only carried by sick oxen, but were more frequently conveyed by shepherds and veterinary surgeons, who brought the infection to the healthy; and it was also transmitted by dogs and other animals which had touched the diseased with their hair, wings, or

feathers.'[1] This philosophic and far-seeing patriot gives us such a high opinion of his wisdom and truthfulness in his work on this plague, that we must quote more largely from it, in order that we may satisfy ourselves how advanced were his opinions, and what the adoption of them by his disciples of a later age would have saved our own country in a similar emergency. As to its being an imported disease, he had no doubt whatever; *Ille fatalis, navi ex Hungariâ advectus bos.* As quickly as possible, when its presence was discovered, all traffic in cattle was to be prohibited, and the law enforced with the utmost rigour in the case of those who moved cattle about. But the disease was still raging; 'as a neglected spark at first, it had at length set Italy in a blaze,' and it was extending everywhere. Pope Clement, with real paternal solicitude, awaited the result of Lancisi's inquiries, and when the time came that the report was to be delivered, there was an assembly of cardinals. Lancisi described the disease, dwelt on its terrific character, and the hopelessness of medical treatment, and then recommended what he deemed the wisest course. 'I advised that every diseased animal should be killed; for I maintained that, should they be left to a slow death, the costs for medicines, veterinary surgeons, attendants, and other means, would be very great; and not only this, but their very presence would assist in the diffusion of the contagion. The Sacred College, however, ordained that this measure was too severe, and that remedies should be tried; and, in truth, they were greatly influenced in this decision by the number of people who pretended they had infallible cures for the affection. But the fact is,' added the sagacious Lancisi, 'that in the cattle, as in the human plague, not every one who takes the disease dies of it. Some recover, thanks to Nature, rather than to the remedies which are resorted to.' The attempts to cure the disease only resulted in failure, and its indefinite extension. Edicts were issued, forbidding the bringing of cattle from the Campagna into the city district of Rome, under penalty of death to a layman, and of the galleys for life to an ecclesiastic. The

[1] *Lancisii.* Dissertatio Historica de Bovillâ Peste ex Campaniæ finibus, anno 1713. Rome, 1715.

sale of hides was interdicted, and the flesh, horns, and fat of the animals were ordered to be buried in deep pits and covered with quicklime. Religious ceremonies were prescribed, and prayers offered, by order of the Sacred College, to stay the progress of the plague. Measures also were taken to prevent the sale of diseased meat. Inspectors were appointed to visit the markets; and only those pieces of flesh which were stamped with a hot iron by the inspector were allowed to be sold. Salting the diseased meat was also forbidden. 'It may, perhaps, be doubtful,' says Lancisi, 'whether the eating of diseased meat is hurtful; but still it is best to err on the safe side.' Skinning the dead carcases was prohibited, because thereby exit would be given to diseased matters, which might thus be spread abroad by the wind, and through the infected soil. 'The severity of the edicts were complained of,' he adds, 'but it is a fact that here, where the laws were strictly enforced, the plague was arrested much sooner than in the other parts of Italy.'

A number of sage measures are detailed, intended to anticipate the misery which might arise from the destruction of cattle; and the great liberality shown by the Papal Government to those who had suffered losses is made manifest. Calculations made of the beasts killed by the plague, during its nine months' visitation in the Campagna and the city district, showed that 26,252 had perished.

The various edicts issued by the Sacred College are given at length by Lancisi, because 'he thinks they will be of great service to posterity, if a similar misfortune should ever again happen—which may Heaven avert! They may be regarded as sure and certain documents, teaching how the plague may be extinguished,' &c. With regard to the nature of the malady, he agrees very closely with the opinion given by Ramazzini in 1711. He reminds us that the Greeks made four classes of cattle diseases: the dry, the moist, the articular, and subcutaneous; and he endeavours to show, that, in this contagion, three of these classes were present, the articular alone being absent. He asks, 'why should we exclude the subcutaneous? . . . Do we not see that the skin is stripped of its hair by the disease, horripilation, tremor of the shoulders and buttocks, and that it is

infected with spots and pustules (*maculis denique et pustulis infecta cutis*)? so much so, indeed, that some have thought that the oxen were destroyed, not by the plague, but by the pustular disease called small-pox (*boves non lue, sed ipsis pustulis, quas variolas vocant, interire*).' As before mentioned, he had no doubt whatever about the origin of the malady in Italy, though there seems to have been some disputation regarding it; thus affording us another wonderful example of the analogy of the outbreak in those days and in that part of the world, to that which we recently suffered from. He says: 'I now come to a question of the deepest importance, wherein there can be no dispute about the mere signification of words. Whence came the pestilence? It is certain that our cattle were free from the plague, previous to the arrival of the Hungarian ox at the estate of Count Borromeo. From that spot, and from that moment, spread the flame which has decimated our herds. The arguments used by some objectors, that the plague appears amongst cattle far removed from a manifest source of infection, are easily disposed of. . . . . Is it not certain that the still more terrible plague which destroys mankind, is often carried to great distances by animals, and in clothes, papers, &c. But where could I find a better proof of the fact than in your own excellent commentaries (those of Bishop Borromæus)? Did not the herdsman who attended the diseased animals, afterwards visit other cattle in perfect health and infect them all, through the contagious particles adhering to his clothes? Did not the most learned Valisnerius write to caution me that the disease might be conveyed long distances by dogs? Considering these things, and reflecting in how many ways, and how far the pestilential virus may be carried by men and animals and by winds, there is no need for me to seek for hidden and unknown causes of the disease, when I have before my eyes the proof of its origin offered by that Hungarian ox. You yourself relate the case of an ox in perfect health, which fell ill immediately after feeding in a field where diseased cattle had been previously pastured; reminding me of the words of Gesner: 'Oxen in feeding infect the grass, in drinking the fountains; when housed they infect their stalls, and in this way healthy cattle perish through breathing the emanations from the sick.'

Lancisi believed that the virus obtained access to the body by the air passages and the stomach.

We have already seen what his preventive measures were; but, he asks, what should we do for its cure? 'My opinion is this (setting aside the prevention of its contagion, which, *mehercules!* I would say, is the most excellent and only mode of averting the disease), that we must endeavour to preserve the oxen from being infected, by giving them proper diet; and that when they are infected, the only thing which can save them from death is still a proper diet. Hitherto the disease has eluded all the powers of pharmacy; and experience has shown, that nothing avails more than a sparing diet. Applications of vinegar, oil, &c., may be used to the tongue, palate, &c. But as to venesection and violent remedies, they are always hurtful in contagious diseases; and the sentence of Hippocrates may be here well called to mind: "So act that if you do no good, you at least may do no harm." I think it is well posterity should know that, of all the many and powerful remedies tried during the pestilence, none has been found which will bear the name of a proper or specific remedy.' He tells us what modes of treatment were generally adopted; how purgation and bleeding only hastened the approach of death, but that acids, mixed with aromatic substances, soothed the inflammation in the mouth. The inhabitants of Mantua and Venice made much use of sulphur, of onions, and of juniper-berries, but, he adds, 'As for our experience at Rome, I must confess that we met with no remedy which could be called true, sure, or sound and specific. Many we found useless; many hurtful; and some few seemed useful.' Some success from his prescribed treatment (giving good food in small quantities at frequent intervals, and washing out the mouth with a mixture of garlic, sulphur, vinegar, and common oil) was supposed to have occurred in the Ecclesiastical States and in Tuscany. As topical agents to be employed in anticipation of an attack, he recommended setons and caustics to be used in the neck, shoulders, and thighs, in order, as he says, to give issue to the virulent matter in a direct manner. One of his chapters is headed thus: 'The only sure Remedy for Warding-off the Pestilence is to prevent all Intercourse of

Healthy with Infected Cattle, and with all other Infected Bodies.' 'It was observed,' he says, 'that those who carefully obstructed every chink through which contagion might approach, preserved their cattle from the plague. Thus, while the disease was raging everywhere, the cattle on the estates of Prince Pamphilo and of Prince Borghese, by the greatest care and watching to avert every possible source of infection, remained unaffected; it was also observed that others, the owners of large herds, had a similar good fortune; and that the Monasteries also escaped the contagion when the disease was rife in the towns, even though they were built in the centre of the plague-haunted districts. This was owing to their cattle having no communication whatever with those beyond the high walls enclosing their pastures.

The last chapter of the invaluable work sums up his admirable reflections on this disease. 'The steps which a wise government should instantly take, whenever (which may Heaven avert!) the pestilence may again appear upon our borders, are these. All roads and by-paths should be carefully guarded, so that no ox or dog be allowed to enter the country. Any animal so entering should be forthwith destroyed and buried. Should the pestilence, however, gain admission, the separation of the sick from the healthy must be enforced by decree. *Indeed, in my opinion, by far the safest course is instantly to destroy the animal, and with the poleaxe, so that no infected blood may escape on to the ground;* for, in attempting to cure the diseased animal, the veterinary surgeon may convey the plague to healthy oxen. The healthy cattle must be removed from their former pastures, which must now be regarded as contaminated. The diseased oxen should be kept in stables, to which no one is admitted except the veterinary surgeon or the herdsman. The fountains and vessels used by the animals should be frequently cleaned with quick lime. The clothes of the shepherds also should be fumigated. The dead carcases, from which not one hair is to be removed, must be buried in deep pits; and any saliva or secretions which may drop from them on the way to the pit are to be carefully removed. If any cows are infected, their milk is instantly to be thrown into a hole in the ground; and the severest punishment should be

inflicted on those who disobey this order. The passage of all rustics and dogs should be forbidden.

'Such are the means, and the reasons for employing them, which I offer for the purpose both of avoiding and of suppressing the plague. *For in truth, when I reflect upon the difficulties*—the expense, the dangers, and the labours incurred in carrying them out, I confess that I know of no means by which the plague may be more easily, more surely, and more expeditiously suppressed, than by instantly knocking on the head every infected animal, and burying it deeply in the earth.' In apologizing for writing the treatise, he says: 'I may be asked of what benefit can this commentary be to posterity, as I have no remedy to offer for the cure of the plague? I answer, of very great benefit; for it is no little thing in human affairs to know what to avoid and what is true—*lucrum etiam in rebus humanis non exigimur est habere certum atque exploratum quod vitemus.* And surely we have learnt this much, that, from the very beginning of the plague, all commerce in cattle must be arrested; and that if we are not able to cure the disease, we know at least how to deal with the evils attending it. Here, as happens in many other diseases, we may prevent their occurrence; but, when once they have possession of the body, we are powerless to cure them—*E contrario, cum jam facta sunt,* nulli cedunt medicamini.' 'Should this plague ever recur hereafter, posterity may study these pages with some satisfaction, and certainly with profit.' Through the energetic measures recommended by this true patriot, Rome and the Campagna were rid of the disease in nine months; while in other parts of Italy it raged for several years. In Ferrara, the malady was observed and described by Nigrisoli[1] and Lanzoni;[2] in the states of Venice, by Mazini; in Modena, by Morandi; and in Cremona, by Cogrossi.[3] Nigrisoli's account of the malady is lucid and exact. The disease was a malignant and contagious fever, and among the remarkably well-observed symptoms, the ulcers and pustules on the palate, throat, and tongue were not overlooked.

[1] *Nigrisoli.* Opinions on the Epidemic Disease in Cattle, 1714.
[2] *Lanzoni.* Acta Eruditor, 1713, 1714. [3] Journal de Venise, vol. x.

Lanzoni's description of the symptoms is good. 'The oxen attacked by the malady spat out their food; then suddenly their ears dropped, and their hair became erect; nearly always a tremor was present; tears ran from the eyes, and mucus (or lymph) flowed from the nose; there was diarrhœa; pustules made their appearance in some cases under the skin, so that they seemed to be attacked by small-pox. At length, in the short space of seven days, they died in great pain (manifested by groaning).'

The malady was also well described at this time by the Medical Society of Geneva.[1]

An epizoötic disease appeared among the horses this year in Italy.[2] It was, in all probability, a continuation of that reigning in the previous year. Valisnieri saw the epizoöty in Verona and Mantua at this time, and attributed it, and the great losses it occasioned, to the presence of enormous numbers of larvæ of the gad-fly (*bots*), which he generally found in the stomach. Dr Gasneri describes the malady, and from his account we gather that the inflammation extended to the serous coat of that organ, and that the mucous membrane was attacked by ulceration of a serious character; this morbid state of the stomach he thought should be considered as the cause of the mortality.[3]

A.D. 1714. Owing to some local causes, the fish died in many lakes in Silesia; and in Alsace, cattle, fowls, hogs, geese, sheep, and horses perished,[4] though Kanold does not specify from what kind of malady. At Frankfort-on-the-Maine, horses and hogs also died.[5] In Dauphiné and the country of Gex, in the beginning of the summer, cattle were attacked by glossanthrax.[6] In many parts of Germany, dropsy or rot (*pourriture*) had prevailed amongst cows, sheep, and goats from the spring-time until the autumn.[7] Small-pox in sheep was general in many regions, and Heusinger thinks it was this disease which appeared in Paris in this and the following year; when so many sheep died, that an ordi-

[1] Reflexions sur la Maladie du Gros Betail. Par la Société des Médecins de Genève, 1715. Paris, 1745.

[2] *Brugnone.* Zucht der Pferde und Maulthiere.

[3] *Réaumur.* Mémoires pour Servir à l'Histoire des Insects, p. 548.

[4] *Kanold.* Jahreshist., pp. 119—206. [5] Ibid. p. 215.

[6] Reflexions de Médec. Genèv. 1716, p. 251. [7] *Kanold.* Op. cit., p. 177.

nance was issued to kill all the pigeons and other birds which might diffuse the contagion. The same disease was common in Italy.[1] The Faculty of Geneva, to whose invaluable Reflections we owe so much, come to our aid in describing this disease as it showed itself at Vernier, a short distance from Paris. 'In this malady there appeared a great number of pustules over the whole of the body, which, after being formed a certain number of days, dried up, and left, when the scabs had fallen off, spots and cicatrices on the skin, very similar to those produced on man after the small-pox. One of the members of our Society had the good fortune to have two of these sheep sent to him, and, on examining them, he reported that the pustules on one of the animals had entirely disappeared, and that there only remained those marks and cicatrices. This sheep appeared lively and thriving. The other had yet the scabs and scurf of the pustules adherent to the skin, but well separated from each other, as in the distinct (*discreta*) small-pox of man, and unequal in size. They appeared very marked about the muzzle and under the belly, and they could be perceived by the touch on the rest of the body through the fleece. The shepherd who brought them said, that, at the commencement of the disease, the sheep were sick and very much prostrated; that their eyes were bleared and tearful; and that after some days the pustules began to appear, and kept increasing for eight or nine days, about which time they began to dry up. He added, that they had only lost four or five out of a flock of one hundred and twenty sheep. We have also been informed that this malady is very common, and is well-known to the French peasants under the name of *claviliere*. It has not been serious this year, but there are times when it is very malignant.'[2] Heusinger imagines that in this description we have the first most complete account of the malady; but my readers will find that Dr Fuller had distinctly made out the analogy between the variola of man and the sheep in 1710—11, though his work was not published until 1730.

In March of this year, canine 'distemper' raged in all the southern provinces of France as an epizoöty, complicated with

[1] *Kanold.* Op. cit., p. 177. [2] Reflexions, &c., p. 130.

gangrenous angina.[1] The Cattle Plague not only yet raged in those countries in which it had been allowed to remain for so many years, but it had also invaded those which had been hitherto free from it. From Russia it penetrated Livonia;[2] from Holland, where, as already stated, it is calculated it killed more than 200,000 cattle, it passed into Liege at the beginning of this year;[3] from Italy, where it was stamped out of Rome in the month of April, after destroying nearly 30,000 head, it attacked Savoy and Piedmont, where it also, according to Fantonius, Professor of Medicine and Anatomy at Turin, slew 70,000. It became spread over Switzerland, and entering France on many sides, it was already in Lorraine and Champagne in the month of March; while, during the spring-time, it was in Dauphiné, Lyonnois, Bourgogne, Nivernois, Berry, Blaisois, Beauce, Orleans, and even in the Isle of France.[4] From the French authorities who described the disease, we have but meagre and unsatisfactory reports, and not at all equal to those of the Italian physicians. The principal would appear to be Guillo, Drouin, and Herment;[5] and it would seem that the terrible malignancy of the plague, its excessive fatality, its extreme infectiousness, and the utter impotency of all remedial measures adopted, severely tested the skill of the physicians, and the fortitude of the agriculturists of France at this time.

In the month of September, according to Kanold,[6] the disease was carried from Holland to England, where it had not been seen for some centuries. But if we believe Mr Bates, it was introduced into London two months earlier. This gentleman was surgeon to George I., and was appointed to ascertain the nature of the disease which had reached Islington, and was spreading in the neighbourhood of London.[7] He states:

[1] *H. d'Arboval.* Dict. Vétér. art. Maladie du Chiens. *Wirth.* Op. cit., p. 215.

[2] *Fischer.* Liefl. Landwirtschaftsbuch, pp. 406—409.

[3] *Kanold.* Op. cit., p. 157. [4] Ibid. p. 204. Reflexions, &c., p. 5.

[5] The observations and opinions of these authorities will be found in the 'Réflexions' of the Medical Society of Geneva already alluded to. Some essays on this subject are also to be seen in a volume entitled 'Jugement de la Faculté de Médecine de Paris sur les Mémoires qui courent touchant la Mortalité des Bestiaux.' Paris, 1714.

[6] Op. cit., p. 227.

[7] To those who are curious in the meteorological phenomena manifested pre-

'About the middle of July the distemper appeared at Islington, and thereupon their Excellencies, the Lords Justices, having notice of it, were pleased to command that I should examine into the truth of the report of its being contagious; and ordered the

vious to the breaking out of this epizoötic disease, or to those who are yet believers in the *spontaneous* origin of this malady in Britain, I will take the liberty of transcribing the principal characters of the months which had elapsed before its outbreak in 1714. Dr Short says: 'We are now entered on a set of dry years, which continued to the end of 1719; the last four were exceeding hot and dry, preceded this year by an uncommon height of the barometer continuing many weeks together, notwithstanding the greatest rains I ever remember. All January, the mercury stood almost invariably at settled dry, commonly marked settled fair. As the weather is mostly close when the mercury is highest, such was the state of this month, the greatest part cold, but little frost. Wind sometimes S.W., but prevalently E. and N.E. On the 6th some flights of small snow; the 18th, 25th, and 29th, small showers. . . . First half of February generally fair and mild like May; the 14th to the end, squally weather, with some white frosts, wind N.; the 17th, gooseberries in bloom; the 19th, dreadful storm at N., and with this a very high tide, overflowing all the Deans. The 15th, morning, wind S.W. blowing hard; P.M. squally, N.W. 3 hor. Morning 5, N.W.; P.M. 6½, N.W., or W.N.W., small storm, then northerly from P.M. 5½ to 6¾. A great number of ships in the road sunk, shored, or driven from their anchors; and houses stript. The mercury sunk the most suddenly that afternoon that ever I observed, and rose as quickly 6½ degrees when the storm was over at 8 o'clock. . . . March, glorious days and nights from the 1st to the 12th, yet hard frost in the morning, wind southerly; then still warmer west winds, and showery weather, with clear nights; the 20th to the 31st, wind northerly, yet sundry pleasant days. Grass grew so fast, that my grass-plot was mown the 13th and the 31st; the 16th, currants shot an inch long, yet the wind southerly; the 26th to the 31st, wind N.E. The leaves of the gooseberries were blasted. I had observed the caterpillars on them in the depth of winter, and they now appeared thick. . . . The beginning of April, the weather set in so cold with hail and snow lying two inches thick, that on the 3rd it froze within-doors. This frost lasted four or five days, the nights cloudless; yet from the 9th to the 12th, 15th, and 17th, warmer by the thermometer than it often is in May or June, especially the 12th. Wind S.W. and southerly. The 19th to the 28th, wind N.E., dry weather, variable winds and showers to the end, with some fogs. . . . The first days of May, warm as those in April; from the 4th to the 6th, wind N.W. with squally weather; to the 24th, easterly winds, and mostly very dry, cold, and clear. Gooseberries and currants not all out of bloom; the 19th, distant thunder, with hail and rain; the 27th, rained almost all day. The artichokes which were fruited in winter, were now no bigger than large apples. . . . June began dry; the 1st to the 3rd, N.E. then westerly and stormy from the 6th to the 10th; the rest of the month N.E. and dry; not very hot yet. . . . July, currants began to ripen, and gooseberries next week. Wind sometimes westerly, but chiefly at E. this month; the 2nd, 10th, and 20th, remote thunder; little rain before the 12th and 13th; the latter half showery, and a great deal the last weeks; the 24th, new corn brought to the mills; the 2nd, numberless butterflies hanging about the gooseberry bushes, or rising from them; on the 7th, the air swarmed with them. Their wings were red, spotted with white; the spawn of the silk-worm caterpillar.'—Op. cit., vol. i. p. 470.

Lord Harcourt, then Lord High Chancellor, to grant such authority as would be proper to make the discovery. Accordingly Mr Milner, Mr Offley, Mr Richardson, and Mr Ward, four justices of the peace for the county of Middlesex, were appointed to make the necessary examinations. Pursuant to these orders, we went to Islington, where Mr Ratcliff had lost 120 out of 200; Mr Rufford 62 out of 72; and Mr Pullen 38 out of 87. They were very unwilling to own it, because so soon as it should be known none would buy their milk; but Mr Ratcliff, a man of good judgment in cattle, after much persuasion, gave us the following account, viz. that they first refused their food, the next day had huskish coughs, and voided excrements like clay; their heads swelled, and sometimes their bodies. In a day or two more there was a great discharge of mucous matter by the nose, and their breaths smelled offensively. Lastly, a severe purging (sometimes bloody), which terminated in death. That some died in three days, and others in five or six, but the bulls lived eight or ten. That during their whole illness, they refused all manner of food, and were very hot. We then advised with several of the cow-leeches, or doctors, who all agreed that it was a murrain, or rather a plague; and that the methods they had tried for a cure had proved unsuccessful. This disease was so surprising, that some of those men who used to look after them, were afraid to go near them.

'We then ordered some of the sick cows to be housed, and several sorts of cattle to be kept with them, to see whether the contagion would affect any other species. The next day I made a verbal report to their Excellencies, of all the several opinions and discourses which I have had about it, and left them debating what method to take; at last I was called in, and ordered to consider of it again the next day, and to deliver to them in writing what would be proper to be done. Accordingly I drew up, and gave them, the following proposals.

'1. That all such cows as are now in the possession of Mr Ratcliff, Rufford, and Pullen be brought, killed, and burnt; or, at least, that the sick be burnt; and the well kept and secured on the grounds where they now are, that such of them as sicken or die of this distemper may be burnt.

'2. That the houses in which those sick cows have stood be washed very clean, and then smoked by the burning of pitch tar and wormwood, and be kept three months at least before any other cows are put therein.

'3. That the fields where those sick cows have grazed be kept two months before any other cows are suffered to stand or graze thereon.

'4. That the persons looking after such as are ill should have no communication with those that are well.

'5. That the same methods be observed if any other of the cow-keepers should get this distemper among them; and that they be all summoned and told, that as soon as they perceive any of their cows to refuse their meat, or have any other symptoms of this distemper, that they immediately separate them from their others, and give notice to such persons as your Excellencies shall appoint, that they may be burnt; and the places where they have stood or grazed to be ordered as before.

'6. That the cow-keepers be required to divide their cows into small parcels, not more than ten or twelve in a field together; and that they be allowed such satisfaction for complying with these proposals as your Excellencies shall think fit; all which is most humbly submitted, &c.

'The next day their Excellencies consulted the four gentlemen before-named, and gave them orders to comply with the preceding proposals, and to allow *forty shillings* for every sick cow which they burnt, that belonged to Mr Ratcliff, Rufford, and Pullen; but the free intercourse which both masters and servants had had with each other's cows (before we were appointed) had spread the contagion; and the disease began soon to appear in several other neighbouring places.

'The gentlemen then summoned all the cow-keepers in the county, and acquainted them with the above-named proposals (to most of which they readily complied, as being visibly their interest), and offered them *forty shillings* for every cow which they burnt, that had not been sick above twenty-four hours; but for such as had been longer ill, or were dead, they would allow them only the value of their skins and horns.[1]

[1] In a book of poems published in 1717, by John Morphew of London, refer-

'Some of the cow-keepers appeared not content with this regulation, and believing that the disease would become general, designed to have sold their cows at some distant market; which the gentlemen having notice of, appointed several butchers to watch near their grounds, and count their numbers every morning, with orders to follow such as they sent to any market, and prevent their being sold, by telling the people what they were.

'Another great obstacle at the first, was the cow-keepers not owning the disease till they had lost several cows; for so soon as it was known that any man had but one sick, none would buy

ence is made to this 'German Cattle Plague,' which, the poet asserts, came in with the accession of the German dynasty into England, after the death of Queen Anne. The poem is very satirical, and particularly dwells on the straits people were put to in the matter of beef and milk.

'As soon as Britain had sustain'd
That fatal loss which Heaven had gain'd,
And parties squabbled to a madness
About their sorrows and their gladness,
A plague unprophesy'd succeeded,
That only reach'd the Horniheaded,
And like a fatal Rot or Murrain,
Turn'd all our bulls and cows to carrion.
. . . . .
'The farriers now their skill employ'd,
But still the cows in number dy'd,
And with their horns and hides together
Were burnt, without reserve of leather.
. . . . .
'Some cunning huxters, who had cows
Old, dry, and lean, not worth a souse,
Tho' sound in health, but scarce deserving
Of pasture, to prevent their starving,
These wisely knock'd 'em on the head
By night, when neighbours were in bed.
Next day assign'd their expiration
To this new fatal visitation:
So bore 'em to some distant pit
Or ditch, for such a purpose fit;
There, to the terror of our isle,
Consumed 'em in their funeral pile.
Then like true hypocrites, put on
A mournful look, as if undone,
And claim'd the sum of forty shilling
For every cow of Heaven's killing—
A gen'rous bounty, that destroy'd
More cattle than the plague annoy'd.'

his milk; and to those who kept many cows that loss was considerable.

'Nor was there ever wanting one or other who gave them hopes of a cure.

'To obviate these three difficulties, the gentlemen encouraged them to hope for a brief (charitable collection), but assured them that such only as complied with these directions should have any benefit of it. Accordingly they ordered a daily account to be taken of the conduct of each cow-keeper, and allowed or disallowed their pretensions to this brief, as well as to the forty shillings per cow, as they complied or disregarded these directions.

'This had a pretty good effect; but here in England, where every man is at liberty to dispose of his cattle as he pleases, nothing but making them sensible that it was each man's particular interest to comply with these methods could do; this, though true in fact, yet the reader will readily judge to be very difficult among such a number; but the gentlemen spared no labour to accomplish it; for that purpose they summoned them one or twice every week, urged all that could be said to induce their compliance, and omitted no warrantable means to frustrate their folly. I had orders from the beginning to assist those gentlemen with my advice, which I did at most of their meetings; as also to make a stricter inquiry into the disease by dissections, &c.

'Accordingly I discoursed the cow-leeches about the customs and diseases that cows were subject to, and consulted such books as treated of them; but concerning this disease could gain but small assistance from either.

'I then made dissections of sixteen cows in different degrees of infection, and found the putrefaction of their viscera to increase in proportion to the time of their illness.

'The first five that I opened had herded with those that were ill, and the symptoms of this distemper were just become visible. In these the gall-bladders were larger than usual, and filled with bile of a natural taste and smell, but of a greener colour. Their pancreas were shrivelled, some of the glands obstructed and tumified. Many of the glands in their mesentery were twice or thrice their natural bigness. Their lungs were a little inflamed,

and their flesh felt hot. All other parts of their viscera appeared as in a healthful state.

'The next six that I opened had been ill about two days. In them the livers were blacker than usual, and in two of them there were several cysts filled with a petrified substance like chalk, about the bigness of a pea. Their gall-bladders were about three times their usual bigness, and filled with bile of a natural taste and smell, but of a deep green colour. The glands in their mesenteries were many of them distended to eight or ten times their natural bigness, were very black; and in the pelvis of most of those glands in two cows there was a yellow petrifaction of the consistence of a sandy stone. Their intestines were the colour of a snake, their inner coat excoriated by purging. Their lungs were much inflamed, with several cysts containing a yellow purulent matter, many of them as big as a nutmeg. Their flesh was extremely hot, though very little altered in colour.

'I have here only given you a general account of my dissections in the three different stages of the disease; for as the difference was but small and the disease incurable, it could neither be useful nor pleasant to the reader to have each particular dissection at large, though I have now the minutes by me. But the following cases being very extraordinary, I could not omit the mention of them, viz.: in one of them the bile was petrified in its vessels, and resembled a tree of coral, but of a dark yellow colour and brittle substance. In another there were several inflammations on the edges of the liver, some as large as a half-crown, cracked round the edges, and appearing separated from the sound part like a pestilential carbuncle. In a third, the liquor contained in the pericardium (for lubricating the heart in its motions) appeared like the subsidings of aqua calcis; and had excoriated, and given as yellow a colour to the whole surface of the heart and pericardium, as aqua calcis could possibly have done.

'In giving my opinion of this distemper, I must beg leave to premise that all cows have naturally a purgation by the anus for five or six weeks in the spring, from (as the cow-keepers term it) the firmness of the grass; during which time they are brisk and lively, their milk becomes thinner and of a bluish colour,

sweeter to the taste, and in greater plenty; but the spring preceding this distemper was all over Europe so dry, that the like has not been known in the memory of any one living; the consequence of which was little grass, and that so dry and void of that firmness which it has in other years, that I could not hear of one cow-keeper who had observed his cows to have that purgation in the same degree as usual, and very few who had observed any at all. They all agreed that their cows had not given above half so much milk that summer as they did in others; that some of them were almost dry; that the milk they did give was much thicker and yellower than in other years. It was observed by the whole town that very little of the milk then sold would boil without turning; and it is a known truth, that the weakest of the common purges you can give a cow entirely takes away her milk; from all which circumstances, I think it is evident that the want of that natural purgation was the sole cause of this disease, by producing those obstructions which terminated in a putrefaction, and made this distemper contagious.

'During my daily conversation at that time with cow-keepers, &c., there occurred many other circumstances of less moment to confirm me in this opinion; but as there was no one reason to give me the least notion of any other cause, I shall not trouble the reader with a useless detail of them.

'Cows are likewise subject to a purgation (though in a less degree) from the same quality in the grass, about the latter end of September, which is called the latter spring, and which, I believe, contributed not a little to the preventing the increase of this distemper; for this purgation coming so soon after the disease appeared, it is not unreasonable to suppose that it freed such cows as were not much injured from the ill effects of these obstructions, occasioned by the want of their vernal evacuations.

'Several physicians attempted the cure, and made many essays for that purpose; but the dissections convinced me of the improbability of their succeeding, with which I acquainted their Excellencies. However, they having received the following recipe and directions from some in Holland, said to have been used there with good success, gave me orders to make trial of it. But

the effect was answerable to my expectation, for in very many instances I was not sensible of the least benefit.

Herb. Aristoloch. Rotundæ,
Veronicæ, āā ℳ. viij.
Pulmonariæ,
Hyssopi,
Scordij. āā ℳ. 4.
Rad. Gentianæ,
Angelicæ,
Petasitidis,
Tormentillæ,
Carlinæ, āā lb. ss.
Bacc. Lauri,
Juniperi, āā ʒxij. Misce, fiat Pulv.

This powder is to be given in water, one ounce at a time, three or four mornings successively; then rest four days, and if the disease continues, repeat the powders in warm water, as before.

'I think there is no one method in practice but what was tried on this occasion, though I cannot say that any of them was attended with an appearance of success, except that of bleeding plentifully, and giving great quantities of cooling and diluting liquids. But by this method, the instances of success were so few that they do not deserve any further mention.

'Their Excellencies being informed that the feeding cows with distillers' grains was a new custom, and was the cause of this disease, gave me orders to examine into the truth of it; but upon inquiry, I found it to have been the practice of several of the cow-keepers above twenty years without the least appearance of any inconvenience, and that some of those persons who had suffered most had never given any. Nor is there any difference between those of brewers and distillers, only that the latter are the drier.

'It was likewise said that the want of water was the cause of this disease, for that the springs and places where people used to water their cows were almost everywhere dry, and that many were obliged to send them several miles for water. This might produce diseases, but such only as they got by the fatigue of being driven so far; for Mr Ratcliff, Mr Rufford, and Mr Pullen,

the three persons where this disease first appeared, had the New River water running through the very grounds where their cows constantly grazed, and could drink at their pleasure, and so had most of the cow-keepers at Islington.

'There were at that time several other reports of the cause of this disease, but none that had a show of reason.

'About the latter end of September the disease increased, and the numbers brought to be burnt were so great that it could not be well executed; therefore it was judged proper only to bury them fifteen or twenty feet deep, but first to make large incisions in the most fleshy parts, and to cover them with quick-lime.

'At the same time, having notice that it was a custom with the cow-keepers to send their calves, when a week old, to Rumford, &c., to be sold; and apprehending by this means that the contagion might be carried into the country, I required all such as had sick cows to bring their calves to be buried, to which they readily consented, and were allowed from five to ten shillings per calf.

'In the beginning of October, being informed that some of the cows in Norfolk, Suffolk, and Hertfordshire had got this disease, and apprehending that it would become general, I gave in the following report to a committee of council: "The distemper among the cattle increasing, and beginning to appear in several other counties, I thought it my duty to acquaint your lordships with the hazard that may attend their not being duly buried. It is the opinion of all authors in physic that treat of contagious diseases, as well as of several of the physicians in town, that the putrefaction of so many cows as there is reason to fear will die of this distemper, may produce some contagious disease among men, unless they are buried so deep that the infectious effluvia cannot injure the air, which I am certain has very seldom been complied with except in the counties of Middlesex, Essex, and Surrey, the gentlemen employed being capable of acting in those counties only. It is affirmed by several now living that there was a mortality among the cattle a little before the last great plague in the year 1665,[1] which was imputed to

[1] Mr Bates evidently refers to the great destruction of cattle and sheep caused by 'rot' in 1663.

the want of a due care in burying them. And your lordships may know of what importance it was judged by the King of Prussia, the States of Holland, and several other Princes and States, by the care they took to publish decrees and placards commanding them to be buried upon pain of death or other severe penalties; and I humbly conceive it would be necessary not only to bury those which shall die, but that such as are already dead may have the same care, as also that they be buried nine or ten feet deep at least. All of which is most humbly submitted, &c."

'Their lordships thought fit to defer all proceeding upon this report till the distemper, becoming more general, should make it necessary; but I thank God that necessity never happened, for within three weeks or a month after the giving in of that report the following particulars concurred to put an end to the disease.

'The cows began their latter purging, which contributed much to prevent the disease from appearing in fresh places, and the cow-keepers were convinced that the disease was incurable.

'The knowledge of the disease was spread all over England, so that none would buy a cow in the country; and the gentlemen prevented their being killed in town by having the markets examined daily, and such meat condemned as appeared suspicious.

'They now divided their cows into small parcels, by which they lost only that in which the disease happened; whereas before that method, when one cow got this disease, if she had herded with one, two, or three hundred (the contagion was such), scarce one did escape.

'Those who had no sick cows avoided all communication with such as had. They likewise found that the keeping their cows so long when ill had been the chief cause of their loss; they therefore now brought them to be buried on the first appearance of the disease, before the contagion could possibly have got to any great height.

'These were the effects of the cow-keepers' dear-bought experience; but it was the indefatigable care and diligence of those four gentlemen, who gave a daily attendance, both early and late,

that secured Great Britain from that terrible ravage, which was made by this distemper in several parts of Europe.

'The severity of this disease in England did not last above three months, though it was not entirely suppressed till about Christmas, but in several other countries it continued two or three years, and I am credibly assured that in Holland it now rages with as much violence as ever; and that they have lost in cows, oxen, and bulls, above three hundred thousand.

'The Providence of God has so disposed the matter of animal bodies, as to render contagious diseases very seldom infectious to different species; but experience demonstrates, that contagions may be communicated to the same species by touching the woollen, linen, &c., to which the infectious effluvia of the disease had adhered, though the two bodies should be yet a very great distance; and I verily believe, that more hundreds died from the infection, which was carried by the intercourse that the cow-keepers had with each other, than single ones by the original putrefaction.

'The nature of contagious diseases are but little understood, and it would neither be agreeable to my design nor useful to the public to say more of this than what was evident; but I have been particularly careful not to omit anything material, either for describing the disease or manifesting the methods that were taken for suppressing it, because it is more than probable that the same care would be equally successful in any other species of cattle.

'The number of bulls and cows lost by this disease, in the counties of Middlesex, Essex, and Surrey, were five thousand four hundred and eighteen; and of calves, four hundred and thirty-nine, and the money insured for them at forty or ten shillings per cow, &c., was the royal bounty of his Majesty from his own civil list, and though neither the four gentlemen nor I made any demand for a reward, or for expenses, yet it amounted to £6674 1*s.* 1*d.* But the entire loss to the cow-keepers, as delivered in upon oath, was £24,500 (exclusive of the £6674 1*s.* 1*d.*), though computed but at six pounds per cow, which, at a medium, was not more than their prime cost, the dearness of keeping them near London necessitating the cow-keepers to buy the very best.

'His Majesty was further pleased, on the solicitation of the four gentlemen, to grant a brief for the £24,500; but the many false reports that were then industriously propagated to lessen the value of these poor men's losses so frustrated that charity, that the entire sum collected (the charges of collecting being first paid) was but £6278 2*s.* 6*d.*, which on a dividend amounted to five shillings and three halfpence in the pound, computing their loss as above, at six pounds per cow; though if we consider their contracts with brewers for grains, their rent of grounds, which lay useless, servants' wages, &c., their real losses may (by a modest computation) be allowed to be ten pounds for every cow that died.'[1]

Some observations on this outbreak in London and its vicinity were made by Mr Bradley,[2] in a treatise on the epidemic plague at Marseilles. He imagined the bovine malady was due to insects. Dr Lobb[3] also gives it a brief notice, and Dr Short[4] offers an abstract of Bates's account, and for 1715 adds: 'The disease of the black cattle, that was so fatal last year near London, reached Essex in January, and did great mischief.' This may be an error, as Mr Bates says the pest was entirely suppressed at Christmas, 1714.

Every effort appears to have been made not only by the government, but also by those intrusted with carrying out its orders, to extinguish the disease. One of the minutes extracted from the Privy Council Register, and dated at the Court of St James's, 22nd Nov., 1714, refers to the memorial of Thomas Bates, Surgeon, touching the mortality of cattle, and which was referred to a committee. 'Upon reading this day at the Board a memorial of Thomas Bates, Surgeon, touching the mortality among cattle, and representing how necessary it is that such cattle as die thereof be buried deep, to prevent any infection in the air, which if

[1] A Brief Account of the Contagious Disease which raged among the Milch Cows near London in the year 1714, and of the Methods that were taken for Suppressing it. Communicated to the Royal Society by *Thomas Bates*, Esq., Surgeon to his Majesty's household and R.S.S. Philosophical Transactions, N. 538, p. 872.

[2] *Richard Bradley, F.R.S.* The Plague at Marseilles considered: with Remarks upon the Plague in General, &c., 1721.

[3] *T. Lobb, M.D.* Letters relating to the Plague and Contagious Distempers, 1745.

[4] *T. Short.* Op. cit., vol. ii. pp. 12, 14.

neglected may affect human bodies, it is ordered by his Majesty in Council, that the matter thereof be, and it is hereby, referred to a committee of the whole Council to consider the same, and to report to his Majesty what their lordships conceive fit to be done therein.'

And at the same Court, on the 6th December, 1714, there is an ordinance enjoining 'Justices of the Peace to keep account of the cattle that shall die of the infection.'

I cannot discover whither the patriot and man of sound sense, Dr Bates, who certainly deserved well of his country in this great emergency, had received any intimation of Lancisi's valuable recommendations when the Roman States were suffering from this fearful visitation, as he nowhere mentions the Italian's name. If he had not acted on the Roman physician's prescription, he certainly deserves all the more credit for profound acumen in discovering at once the wonderfully contagious nature of the malady—the undoubted agency in its diffusion, and the hopelessness of all remedies save the one, as well as a promptness of decision which saved Britain from a great peril. And no less credit is due to the 'four gentlemen' who, instead of denouncing him as 'ignorant and barbarous,' successfully opposing his measures, patronizing every cow-leech, urging 'several physicians' to attempt '*the cure*' or wasting precious time with 'one or other who gave them hopes of a cure,' personally carried out his suggestions, nor allowed the visionary success of the Hollanders to interfere with the only feasible way of promptly quelling a dire contagion. The conduct of Britain was held up to universal admiration, as the first nation which had shown sufficient energy and resolution to cope with the pestilence then ruining the States of Europe. Professor Fantonius, writing to Lancisi in 1716 regarding the Cattle Plague, says: 'In former years, in a province of the British Isles, we heard that a deadly plague had sprung up suddenly among cattle, which destroyed them very quickly, and truly by no other cause than a recent contagion conveyed by suspected oxen. They expelled the disease by no other artifice than the slaughter of infected and suspicious cattle.' The approbation of the Professor at the manner in which the disease was got rid of, is conveyed in very strong terms, and he expresses

himself to the effect that the English are (or rather, were) an energetic and vigilant people (*gens vigil ac strenua*), who exhibited wonderful courage and devotion during the severe ordeal. Since that time this example of wisdom and energy has been frequently alluded to, and nations who are always threatened with this plague have on many occasions preserved themselves from its ravages, by acting as suggested by Dr Bates. In a recent French publication, the adoption and enforcement of these measures is alluded to as follows: 'The disease having passed into England in 1714, the English government saw no other means of arresting its course and saving the great number of animals which were menaced by it, than immolating all those that were infected, and following the advice which Lancisi had given to his country. This sacrifice was about six thousand, and the contagion was destroyed in less than three months; while Holland, which obstinately and uselessly sought for remedies to cure it, had the misfortune to endure its ravages for three years. The English are, then, as we perceive, the first people of Europe who have given us an example of such conduct.'[1]

Paulet, with great truth and common sense, observes of this emergency,—' Les Anglois sont donc, comme on voit, le peuple d'Europe qui a donné le premier l'exemple d'une pareille conduite; et en effet, lorsque l'incurabilité d'une maladie semblable est bien constatée par des expériences multipliées, c'est perdre un temps précieux que de chercher d'autre moyen d'en arrêter le cours. Outre les raisons politiques qui décidèrent le gouvernement Anglois à prendre ce parti, comme le plus prompt et le plus sûr, il y en avoit d'autres bien capables de l'y déterminer: d'une part, la certitude physique où l'on étoit que le levain de la maladie avoit été apporté des pays infectés; et de l'autre, l'exemple des mauvais succès dans les différentes tentatives mises en usage par les autres peuples d'Europe. L'expérience a appris depuis, que le massacre des animaux pestiférés, dans certains cas, est l'unique moyen de faire cesser entièrement la contagion.'[2]

[1] Dictionnaire Usuel de Chirurgie et de Médecine Vétérinaire, p. 362. Paris, 1859.

[2] *Paulet.* Op. cit. 'For a long period, no irruption of any malady from abroad had been noted in this country, particularly of the nature of 'Cattle Plague.' The

It has been computed that, from 1711 to 1714, no fewer that 1,500,000 cattle died of the Cattle Plague in Western Europe. How many sheep and other ruminants perished from this affection, we have no means of ascertaining, though it is a fact that they suffered extensively.

only serious affection among cattle of previous years appears to have been the malignant carbuncle, splenic apoplexy, or anthrax.

CHAPTER V.

PERIOD FROM A.D. 1715 TO 1745.

A.D. 1715. In Germany, France, and Italy, the weather was damp and unhealthy for mankind. Lanzoni, writing from Ferrara, says: 'After the plague in oxen in the preceding years, and the copious rains which so much damaged the soil, we saw the whole ground at Ferrara vitiated by stagnant water, so that the seeds of the future harvest were for the most part spoilt; whence the scantiness and high price of provisions in the year 1715. A loss of health consequently ensued. In the beginning of the month of March, a large quantity of toads and frogs were observed; and in the middle of spring swarms of midges, worms, snakes, flies, butterflies, locusts, and caterpillars, from which many people predicted disease to mankind. Hitherto the month of May had been intolerably hot; soon, however, the air was misty and moist. June succeeded with great heat, which originated many fevers. . . . . Many attribute the cause of the fevers to the wine, which, on account of the inclemency of the season, had been made from unripe grapes, and had for that reason produced impurities and excited fevers. Not a few attributed the calamity to the effect of the unburied bodies of oxen killed by the plague in the preceding year, and also from those buried. For, they said, particles, offensive and injurious, came up through the pores of the earth from the corrupt carcases, and infected living bodies. Some thought that the in-

ternal cause of these fevers was viscid and tenacious humours, hardly able to be separated; but that the external cause was in the impurity of the land from the copious showers and overflowing of the rivers, the whole country appearing flooded, whence the herbage became noxious and injurious. From this cause, also, diseases in animals, destruction to trees, and blight in corn ensued; for nitro-sulphureous particles continually rose and destroyed all growing fruits by burning them up.'[1]

In Spain and Portugal a great drought prevailed, which proved very destructive to the animal and vegetable kingdoms. Kanold writes: 'I am informed that in Portugal, in consequence of the long winter, which was very severe, and the continued dry east wind, which lasted until the month of February, as well as from the scarcity of water and grass, a large number of sheep and lambs died. The drought was so great in the provinces of Alemtejo and Algarve, in Spain, that not only the best springs were dried up (a circumstance which had not occurred for many years), but in many places in the same country, the water for the daily necessities of men and cattle was sold by measure, so that many villages in La Mancha were totally abandoned by their inhabitants.'[2]

The diseases of the lower animals were very prevalent in every country, and more especially in those places where the Cattle Plague had been allowed to spread by endeavouring to treat it medicinally. The chief maladies, however, according to Kanold, were due to the morbid constitution of the atmosphere. In Silesia, for example, he describes a disease which broke out there. 'The cattle suffered most from purging, but they also at the same time slavered much, and a foul mucus discharge from nose and eyes was noticed. Languor, loss of appetite, emaciation, and loss of milk, were the usual symptoms. Pregnant cattle aborted, but not for some time; often not for from eight to ten weeks, and those which did so died of the disease. As a rule, death did not take place quickly, but the animals lingered on frequently for several weeks. Nevertheless, in consequence of the disease being contagious,

[1] Ephem. Nat. Cur. loc. cit., p. 12. [2] *Kanold.* Jahreshistorie, p. 253.

many died in a short time. On opening the dead bodies, the stomach and other viscera were found diseased, mostly from chronic corruption; the heart was wasted, the lungs full of ulcers, and the omasum was loaded with matters as hard as a stone; the gall-bladder was a quarter of an ell long, and full of bile; particularly, in all, the liver was observed to be full of hydatids (*egeln*). Externally, however, it appeared healthy, though internally it had many large cavities enclosed by callous walls, and containing a clear yellow ichor; but in these were no hydatids, they being only found in the substance of that organ.'[1]

A disease amongst horses prevailed in many countries, especially in Montferrat and Piedmont, in Italy; also in Sicily, in the Morea, and in Pomerania.[2] Many hogs died in the country around Cologne. In the same country, and also in the meridional provinces of France, an epizoöty of *gastro-bronchitis* (or 'distemper') amongst dogs.[3]

The Cattle Plague had been subdued in the North of Europe; it continued to rage, however, in Holland, in the north-east of Germany, in some of the Swiss cantons, in Milan, Piedmont, and Lucca, in Italy, and in some districts of France.

On the 24th of September, the volcano of Taal, in Manilla, caused much devastation by an eruption. The waters of the lake in which it stands were so impregnated with bituminous matter, that all the fish died and were thrown on the shore, where they gave out an insupportable odour for a long time.[4]

A.D. 1716. The winter of this year was very severe throughout Europe, and the summer was cold. During the winter the Cattle Plague disappeared in Italy, and only the cold and some less serious maladies caused losses in animals at Vercelli and in the kingdom of Naples. In France, the bovine pest was dying out; but in Holland, Saxony, Thuringia, and in the whole of Lower Germany—above all, in Westphalia, Hanover, and Brandenburg, it yet continued to do immense damage.

'In England, in January, the Thames was frozen many miles,

[1] *Kanold.* Op. cit., p. 261.
[2] Ibid. pp. 252, 258.
[3] Ibid. Breslauer Sammlung, 1719.
[4] *Haussmann.* Voyage en Chine, &c., vol. ii. p. 249.

whole streets of booths were erected, coaches driven, sports and diversions were used above the bridge. Thermometers lower than on December 30, 1708. Spain suffered greatly by it. Wild beasts, forced out of the wood, made strange ravage. Most goldfinches, beside many other small birds, were killed by it.'[1] Rutty, of Dublin, writes: 'A general Rot among the sheep, as I am well assured, did also prevail here, A.D. 1716, after the great frost of 1715-16, and which, indeed, is said to have been more universal than this (of 1752), for that destroyed the sheep even upon the best lands.'[2]

A.D. 1717. This year was generally cold, especially in the month of February. The spring was cold and damp, the summer warm, with heavy rains, but the autumn was mild and agreeable. An eruption of Vesuvius began in June and lasted until the next year. In the Roman States an invasion of locusts did much harm. Friesland was inundated, and half the province of Groningen destroyed, while all the Lower Elbe was under water. Plague in mankind at Marseilles and in Aleppo. Ergotism very prevalent, as well as epidemic jaundice. In Silesia, there was great mortality amongst bees and carp, and in Hungary an epizoöty amongst geese and turkeys. 'From June to July, there appeared a severe epizoöty amongst turkeys and geese, of which a large number died in a short time under the following circumstances. For some days it was observed that they sat moping, without any appetite, or inclination to eat, and at last became quite giddy, staggered, and suddenly fell dead. In numbers of them were discovered, under the feathers, suppurating tumours or pustules, and dry scabbed eminences, and many believed that this was a species of variola or small-pox, but how it originated could not be discovered. Some thought it arose from the fact of the dead diseased cattle having been improperly buried, and that the geese, having eaten of the grass around their graves, were consequently attacked by a similar disease in the throat. To the same effect we hear from Prussia, and also Brandenburg, that not only the herbage, but the ponds were poisoned by a noxious mist or vapour, so that the surface of the water

[1] *T. Short.* Op. cit., vol. ii. p. 18.

[2] *Rutty.* Op. cit.

appeared quite blue; and before this poisonous element could be dissipated, foals, calves, and geese which drank of the water were killed by it. Even the fish in these waters died, and were cast upon the banks. Crows, magpies, and ravens, which had fed upon the fish, were often found dead.'[1]

Kanold describes an epizoöty which broke out among the army horses in Finland and Ingermanland (Ingria), and destroyed great numbers. From the fatigue and hardship to which they had been exposed during the past year, it is probable that the malady was glanders in an acute form.[2]

In England 'the weather was clear and air healthy all October, but a fatal month to oxen and swine.'[3]

The Cattle Plague ceased its ravages in this year as a general epizoöty, its cruel effects being only displayed here and there at irregular intervals. It may be said to have terminated its devastating career in Hungary, Prussia, Silesia,[4] and Bavaria.[5] Lanzoni, writing from Ferrara, says: 'The gifts bestowed by Ceres, Bacchus, and Pomona in this year were many, and there was but little disease amongst men; but this was not so to pigs and cows, for Death's scythe was busy on them. Wherefore fear took possession of the people in the provinces, lest the contagious epidemy of the year 1713 should reappear in the bovine race, and the very thoughts of such a visitation excited them to tears.'[6]

A.D. 1718. A cold winter, but a hot summer, with great drought. A comet was visible this year. At Wismar, in the grand-duchy of Mecklenburg-Schwerin, on the Baltic, a deadly epidemic fever (*enteritic*) appeared, and at the same time an epizoöty of geese and fowls. Again Kanold describes it: 'This spring the increase of the feathered tribe was very great; but this good fortune was much hindered here and there by a disease which appeared among the fowls and geese, and which began chiefly in the month of June. It was a sick-

[1] Breslauer Sammlung, vol. i. p. 50.
[2] *Kanold.* Ibid. vol. ii. p. 43.
[3] *T. Short.* Op. cit., p. 20.
[4] *Hoffmann.* Consilium de Lue Boum. Ej. Cons. Med. 1721. Vol. i. p. 115.
[5] *Kanold.* Breslauer Sammlung, vols. i. p. 46; iii. pp. 535, 799.
[6] Ephem. Nat. Cur., cent. vii. and viii. Appendix, p. 20.

ness having, for a prominent symptom, a swelling of the head. This occurred principally in young fowls. When so affected they made a noise something like a thrush, and were so blinded that they could not find their way to their food. They then became emaciated and died; so that large numbers perished. Geese, and especially the goslings, were most affected, and from this month until September, frequently died in large numbers. The principal symptoms of the disease consisted in the geese becoming weary and languid, their feathers stood on end, and they became poor, so that they seemed to stand on longer legs. The crop swelled, though empty,—because nothing was eaten, and they sank through debility. This malady did not affect the ducks; at least not so much as the geese.'[1] This would appear to have been an anthracoid affection.

The same epizoöty broke out in Silesia, and in the autumn nearly all animals were affected, pigeons, even, having symptoms of a variolous disease. Horses seem particularly to have suffered. 'The horse disease (*pferd-staupe*) raged in Militschischen (Silesia). At Zessel there is scarcely a horse that is not affected. At Grossberschütz several horses have already died. This malady consists in a disease of the tongue, which becomes ulcerated or eaten away, so that the animals cannot eat. A good remedy for this disease consisted in washing the tongue assiduously with sage and rue boiled in vinegar. (Evidently glossanthrax.)

'The sheep, in many places, already in this month began to cough badly. From Trebnitzschen we hear that the swine in the oak forests had, in the end of October, a special malady, from which they frequently died. The acorns, which were generally very maggoty, and a tenth part of which were worth nothing, had received the blame for the production of this mortality. From Medziborschen we also hear, that, from July, a disease appeared among the swine there. Its symptoms were a tumour on the throat, which threatened suffocation. When the tumours were cut into in time, many were saved. To this we may add, that, in October, the pigeons were seriously affected with symptoms of small-pox (*blattern*).'[2]

[1] *Kanold.* Breslauer Sammlung, vol. iv. p. 1175.
[2] Breslauer Sammlung, vol. vi. p. 1711.

A.D. 1719. This year an aurora borealis was observed, which was calculated to be no more than thirty-eight miles from the earth. An epizoöty of variola ovina in the Venetian States,[1] as well as in Bohemia. In the latter country it is thus announced: 'In Reichstadt, there has appeared for the last two months, a disease resembling the small-pox of sheep (*schafblattern*). In Brzesniowitz, the geese suffered from a disease. The livers and gall-bladders became so enlarged that at last they were ruptured, and the creatures died. The skin of the body was yellow. In addition to this, we may relate that a plague among certain vermin has been noticed at Zürich; the wasps and lizards (salamanders) died in large numbers.'[2]

A great mortality prevailed among the silkworms in Italy.[3]

Dogs were attacked with rabies in different countries, particularly in Silesia and France, from this time until 1721.[4]

A.D. 1720. Earthquakes and volcanic eruptions are mentioned in this year. A deadly epidemy raged in various parts of France, but especially in Provence, and killed an immense number of people. Miliary fever prevailed in the Lower Seine. From 1719 to 1721, strange irruptions of mice are recorded. Especially was this remarkable event observed in Transylvania, and it is thus described: 'In the midst of so many phases of the Transylvanian epidemy, and after the memorable drought of 1719 had burnt up the earth with heat . . . . . mildew rendered the crops useless, and an incredible number of mice appeared. The troubled people beheld them coming from the east, and successively occupying the country, one swarm after another. There was much difference in their size and colour; most of them were like the domestic mouse, some of them resembled moles or the *lesser* cat-kind (*catorum minorum*); and which you would say equalled in size the *alpestres mures*. From the month of May until late in the autumn, they spread through almost the whole province towards the west, perforating the earth on all sides with contiguous holes like those of a sieve. At first they ate only the tender grass, then the green corn, and lastly they consumed the grain. Strange to relate, towards the close of the autumn, and as if en-

[1] *Bottani.* Op. cit., vol. ii. p. 134.
[2] Breslauer Samml., vol. x. p. 460.
[3] Ibid. vol. viii. p. 680.
[4] *Wirth.* Op. cit., p. 236.

dowed with a providential care, having excavated a wonderful series of subterranean passages in their own style of natural architecture, they stored up not only good corn as provision for the future, but also choice berries, grapes, and whatever else served as human food. They carried and collected all these into distinct compartments with admirable perseverance. Whether, however, it was owing to the damage done to the corn and the vines, or to the effects of the impoverished herbage, or, on the other hand, to the presence of some hidden infection, there was something obviously hostile not only to the breeding of cattle, but also here and there to pregnant mares, which aborted. Whilst it was hoped that the frosts of winter, and the snow and floods, would suffocate and destroy these mice, their presence hindered the anxious peasant from sowing new seed. It was also fondly believed that as an east wind had brought them, so a wind from an opposite quarter would drive them away. When, however, an irregular winter, with unusual tempests, set in, and this was followed by a very late and cold spring, these multitudes of mice withdrew themselves into the towns; so that there was no work done by the inhabitants, who were banished from their dwellings by their ungrateful guests. Things had arrived at this pass, when there appeared, by a wonderful interposition of nature, a great army of weasels, by which these mice were all slain in an incredibly short space of time, and their dead bodies lay heaped up in the fields.'[1]

At the same time, an epizoöty of glossanthrax in horses and cattle seems to have been very severe in Poland, Prussia, and Courland.[2] Small-pox of sheep in Saxony.[3] Scheuchzer, speaking of the plague in man in Provence, writes: 'We are further to notice the hot summers of 1718-19, which brought the grapes and other fruits in Helvetia to such perfection before the usual time, and, moreover, that the summer of 1718 caused in October and November a variety of rheumatic fevers and pleurisies, as well as diarrhœas and dysenteries. In June and July, the destructive contagion among cattle raged in Pündten and

[1] *Sam. Köliser.* Ephem. Nat. Curios., cent. ix. x.
[2] *Fischer.* Liefländ. Landwirthschaftsb., p. 410.
[3] Breslauer Samml., vol. xiii. p. 622.

the territory of Sax. Then came the very mild winter in 1718-19, and an irregular spring, in which the vegetation was now accelerated, now retarded, as the damp increased or diminished; and thereupon came to us all kinds of fevers, small-pox eruptions, dysentery, rebellious coughs, and diseases of a gouty character. In March, affections of the lungs; in April, fevers and small-pox; in May, tertiary fevers; in August, eruptive fevers on the skin, as if one had used cupping glasses; and dysentery. The cattle disease in Pündten, Servia, Wallachia, Bulgaria. The following winter was again mild. In January, lung diseases, fluxes, and affections of the limbs; in February, dangerous small-pox among children; in March, violent fevers, and inflammation of the throat; in April, agues, ophthalmia, and spasmodic diseases. In May and June, when the epidemy in Marseilles broke out, tertiary duplices reigned. In September, all along the Rhine there were extraordinary, and, in some cases, very bad fevers. The whole summer was more than usually wet; so that it was no wonder that people became weak and relaxed. We might add to these causes the influence of several meteors, and may draw special attention to a large fiery ball or comet, which stood about 14 German miles above the earth, and was seen on the 22nd February, 1719, at seven o'clock in the evening, between Corfu and England. by nearly the whole of Europe. This possibly diffused sulphureous and poisonous gases into our atmosphere. We could ourselves detect the presence of a noisome exhalation of this kind, of various luminosities, and other phenomena seen in our own country at that time. We must assuredly not forget to mention that swarm of locusts which devastated Provence and Languedoc in 1719.'[1]

An epidemy in Peru. It commenced in 1719, at Buenos Ayres, and extended to Central Peru. It appears to have been a very deadly form of typhus, and was said to be highly contagious; the lower animals were affected. 'It was observed that the greater number of the llamas and donkeys employed in carrying the dead bodies to their graves were affected with the emission of blood from their mouths.' This disease, which was designated

[1] *J. J. Scheuchzer.* Beschreibung der Provencalischen von A—— (Astruc). Zürich, 1721.

by some a 'malignant catarrh,' only lasted a month. It was preceded by an earthquake and an eclipse of the sun.[1]

A.D. 1721. The winter mild, but the spring-time cold and damp, and the remainder of the year wet. Locusts in France and the whole of Italy. Epidemic ergotism in Silesia during this and the next year, and scarlatina in man at St Petersburg, Courland, and Lithuania. So notorious was it that diseased grain produced formidable diseases in the lower animals, that while the epidemy continued at Silesia, the King of Prussia issued an edict forbidding the use of rye tainted by the ergot, because it seriously effected *horses* and *pigs*.[2] A curious circumstance noted at this

[1] Transactions of the Epidemiological Soc., vol. ii.

[2] *Hecker.* The uncertainty pertaining to the nature of the epizoöties of the Middle Ages, leaves us in doubt as to whether some of them might not belong to that class which have a common origin with many of the epidemies of mankind. The *ignis sacer, arsura, clades seu pestis igniaria, ignis Sancti Antonii, Sancti Martialis, Beatæ Virginis, ignis invisibilis, seu infernalis*, &c., would all seem to be employed to denote the same affection, and which we have reason to believe was ergotism. It is only by chance, as it were, that wide-spread and fatal diseases among the lower animals are mentioned as occurring coincidently with these obscurely-named epidemies, and when we read that the causes of their outbreak were unfavourable weather, which brought about a diseased condition of the crops and pastures, we are only partially enlightened as to the nature of the affection.

The *scorbutus* of the 15th and 16th centuries has been supposed, with much reason, I think, to have been ergotism, and up to this period it appears to have been developed in a gangrenous form. At this time, however, it changed to the convulsive type, which it has chiefly maintained to the present. A curious feature in this disease is shown as it appears in the South and North of Europe. In the South, the gangrenous form is the rule ; in the North, the convulsive form is particularly marked, and very rarely the dry gangrene ; while a few of the epidemies present both characters. The same peculiarity is observable in the phenomena of ergotism in the lower animals during the existence of an epidemy, and it has also been shown to exist by experimentation ; the only exception would appear to be in the case of gallinaceous birds, in which gangrene of the crest or comb is the most constant phenomenon. It is not until the 17th and 18th centuries, that we can with certainty find authors describing ergotism in the epizoötic form in animals, and from that time till now observers have been numerous.

It may be mentioned, however, that Traube, who has described the epidemy of 1770, in Hesse and Hanover, declares that no ergotism existed amongst the lower animals, with the exception of a pig, which he saw affected with symptomatic convulsions. Horses ate the diseased rye with impunity, and cattle fed on the rye flour without inconvenience, though not without repugnance. Dogs and sheep, also, escaped save in the little village of Lohe, where seven of the latter died in convulsions. These creatures had pastured in a rye-field after a harvest made in very dry weather, when much grain was shaken out of the ear. He did not discover a single instance of abortion ; but in the following spring, the people in the villages where the dis-

time, is the noise made by the storks in Silesia. 'On the 23rd of April came the storks in a large swarm from south to north over the city of Breslau; this the superstitious considered as an omen, and prophesied the arrival of strange people. From Luzin it was said the storks at this time had thrown everybody into astonishment, for in April, after their arrival, large numbers of them might be seen in rows together, so that at a distance they were taken for a crowd of people; some estimated these groups at 400, and noticed that they formed a circle and pecked themselves. From Rawicz: On the 12th April came a large number of storks in the morning, flying very high . . . . From Luzin they write in May, that there was much talk of the storks, in consequence of their pecking themselves so constantly, and when they lay eggs, they afterwards break them and go away, but come occasionally back again, and bite themselves very much.'[1]

In the same year, and the same country, rabies in the dog seems to have been wonderfully frequent.[2]

Another strange phenomenon was the generally laborious parturitions of the domestic animals at this period: 'the sheep in many places lambed with great difficulty, so that the shepherds were obliged to use force to deliver them.' 'Among the cattle one hears of nothing particular beyond the fact that the breeding cows and ewes brought forth their young with great difficulty, so that force was obliged to be used to assist them. At Strelitz three fine young cows died from this laborious parturition. They strained so violently that all their internal organs were protruded. Such cows, however, might be saved, were these organs bathed with warm water, gently returned, the labia of the vagina sewn together, and the animals slung up with their hind quarters elevated. This procedure is always necessary when such accidents

ease had been most prevalent, complained of the scarcity of chickens, the hens laying but little and not hatching. Nothing like this occurred in the localities where there had been no ergotism. Two fowls were sent to him presenting spasmodic symptoms; when placed on their feet they fell on their sides, struggled with their limbs, and their heads hung helplessly down. When they spasmodically struggled to get up, their phalanges were violently contracted. They died in about four weeks, and with severe spasmodic attacks.—Geschichte der Kriebelkrankheit, 1782, pp. 13, 15.

[1] Breslauer Samml., vol. xvi. p. 436, 556.

[2] Ibid. vol. xv. p. 166.

occur.'[1] Cattle Plague was very destructive in Schonen, Sweden, in this and the following year.[2]

A.D. 1722. Plague in man at Vienna, Hungary, and in the East. Dysentery in Upper Saxony, and epidemic pestilence at Granada. In the Venetian States, a singular epizoöty appeared. 'In the year 1722, a thanksgiving was offered in the church of San Bellino—a commune now united to the district of Lendinara, in the province of Rovigo—because of an unknown epizoötic disease which attacked every sort of quadruped, but especially cattle and sheep. It manifested itself in the animals by making them jump, and by rigors all over the body.'[3]

There was a great destruction amongst the fishes in the lake of Constance, caused, it is conjectured, by the excessively high temperature in the month of March, and subsequent extreme cold in April. When the dead bodies were examined, it was found that the swimming or air-bladders were extremely distended, and that reddish pustules were formed on all the viscera.[4]

Canine rabies was frequent in Silesia and Hungary, and many geese died.[5]

A.D. 1723-4. The winter of 1723 was cold, the summer damp. The year 1724 was hot, and fruits and wine were abundant. In Iceland, there were volcanic eruptions which lasted till 1730. Earthquake at Lisbon. Palermo nearly destroyed by an earthquake. Yellow fever in mankind in Spain and Lisbon. Miliary fever at Frankfort on the Maine. The pestilence in Spain was attributed to the use of fruit and snow water. Epidemic catarrh amongst children in the principality of the Asturias. In 1724, a deadly epizoöty of ovine small-pox in the Venetian States, lasting from August to December.[6]

In this year, M. Astruc, when treating on the plague in man, casually mentions the prevalence of sheep small-pox in France, and declares that not only is the disease highly contagious when propagated from sheep to sheep, but that it can be transmitted to other animals. He cites as a fact, that wild rabbits, coming to eat the herbage on the pastures of infected flocks during the

[1] Bresl. Samml., vol. xv. pp. 163, 262.
[2] *Heusinger.* Op. cit., p. 202.
[3] *Bottani.* Op. cit., vol. v. p. 94.
[4] *Didier.* Traité de la Peste, p. 540.
[5] Breslauer Samml., vol. xxii. p. 646.
[6] *Bottani.* Op. cit., vol. v. p. 137.

night, are seized with the disease, and whole warrens were thus destroyed. These diseased rabbits, he says, were often the cause of the infection being carried to other flocks, by their frequenting the pastures of the healthy sheep after they had been on those of the tainted. The shepherds of Languedoc, but especially those of Cévennes, were so well aware of this, that they took every precaution against the entrance of these creatures to their grazing grounds. Ferrets and firearms were employed to destroy them, and the herbage on which these creatures or diseased sheep had been grazing, was burnt; the pens were purified, and the healthy flocks were sent to pasture elsewhere. M. Astruc adds to the symptoms already known, those of debility, drowsiness, and sometimes vertigo, diarrhœa, and dysentery; smallness of the pulse, and subsequent eruption of pustules of different forms. These observations were made in Languedoc, where the disease is not unfrequent, notwithstanding the natural salubrity of this province of France, and the favourable qualities of the water and herbage. It was a constant and familiar observation, though no cause could be assigned for the outbreak of the disease, and which was patent to all who had charge of sheep, that when an infected flock had been in a pasture, those flocks which succeeded them became affected. This was more particularly noticed at Cévennes. In the mountainous part of this Canton there were some excellent pastures, where all the flocks of the neighbourhood met. In travelling to this locality, the shepherds were particularly attentive to everything that transpired, and if they became aware that an infected flock had passed before them, they immediately stopped and remained where they were until the next day. Their object in doing this was founded on the belief, that it was necessary to allow one night to elapse, in order that the cold, combined with the dew that fell, might destroy the pestilential particles which were capable of communicating the malady. Such was the general opinion in this part of the country at this time.[1]

Sheep died in immense numbers from 1723 to 1724, from the disease termed 'rot,' in Silesia, Poland, and Prussia. The Cattle

[1] *M. Astruc.* Dissertation sur la Contagion de la Peste, chap. vi. Toulouse, 1724.

Plague, which had never been quite extinguished on the Polish frontiers, made great havoc, in 1724, in Thuringia, Saxony, and Magdeburg. At Karaschtz, in Silesia, there was an extraordinary disease amongst mice. 'In the month of April appeared an epizoöty among mice, which caused them to issue from their holes and recesses in great numbers, and to seek the society of mankind. They came forth staggering, and soon swelled up and died; so that they were found lying in heaps on the granary floors and in chambers, and as neither cats nor pigs would eat them, they were obliged to be buried.'[1]

A.D. 1725. Exceedingly wet and damp, and the following winter cold and long. 'Was a year of blight, the like of which has never before been heard of in England.'[2] Malignant fevers prevailed in mankind all over Europe and America. Inoculation was practised on criminals as an experiment. Moles were observed to be curiously frequent in man.[3] The rabies of dogs still continued in Silesia, and it was also discovered to affect wolves. An observer of this fact says, 'The principal reason for this appears to be in the atmosphere and the weather, as well as in the constitution of the animal. Such madness seems to be quite common in some other places.'[4]

An exceedingly violent form of 'grease' in horses (*impetigo erysipelatodes*) broke out at Ratisbon, and involved the structures of the feet, as well as the skin, in putridity. 'This disease, within two months, attacked more than four hundred horses. The first symptoms were tubercles in the pasterns, which in a few days suppurated, and after a time large pieces sloughed out; so that the poor horses were much harassed, and many could not lie down for fourteen days. It was pitiable to see them try to walk from one side of the stable to the other: they stood full of fever and pain, ate little, fell off in flesh; the hind feet were generally swollen, seemed corroded, and stank abominably. From the fore feet whole pieces usually fell out, and the wounds remaining healed but slowly.'[5]

A.D. 1726. An exceedingly dry and hot year. Honey-dew and

[1] Breslauer Samml., vol. xxviii. p. 398.
[2] *Full's* Husbandry.
[3] Breslauer Samml., vol. xxxiii. p. 90.
[4] Ibid. vol. xxxiv. p. 635.
[5] Ibid. vol. xxxi. p. 261.

rust were very abundant on the crops and forage, and this has been regarded as the cause of the great mortality amongst cattle which was observed during the summer, especially in June and July, in Poland, Silesia, and Saxony. Indeed, the whole of Germany seems to have been ravaged by this disease, which, from the accounts of various authors, was carbuncular fever. Not only did cattle suffer, but the deer tribe also died in numbers, and fish perished in the ponds and lakes.[1]

In Silesia and Lusatia, complaints continued to be made of madness in dogs.[2] Sheep small-pox very destructive in Eichsfeld and Thuringia.[3] Wirth says: 'In the winter of 1726-27, epizoötic pleuro-pneumonia (bovine) spread everywhere in Switzerland, and to the neighbouring countries.'[4] An epizoöty amongst fowls in Courland. The description is imperfect. 'An unforeseen epizöoty broke out amongst fowls, so that they wasted away in flesh, would not eat, and when their feathers were parted, their bodies were found to be covered with lice. At last an uncommon growth or *carcinoma* appeared between the legs near the anus. . . . . In this manner a vast number of fowls died.[5]

A.D. 1727-28. Rutty writes: 'In November, in Staffordshire and Shropshire, their horses were suddenly seized with cough and weakness, disabling them from labour.' 'The spring variable; summer variable, inclined to fair and dry; autumn wet; winter mild and open. In December, both in Dublin and the remote parts of the kingdom, the horses were seized with a cough and shortness of breath, and sometimes sore-throat; some bled at the nose. A large discharge of thick phlegm from the nose, long continuing, was salutiferous. Some died in the streets, partly through the carelessness of their masters exercising them abroad, even during this disorder, partly through neglect of bleeding and purging, and partly from improper medicines. December 25th. The horses growing better; coughing and sore-throat seized mankind in Dublin.'[6]

A.D. 1729. From 1727 till this year, the weather was remark-

[1] Breslauer Sammlung, vol. xxxvi. p. 690; xxxvii. p. 54.
[2] Ibid. vol. xxxv. pp. 56, 1177, 325.
[3] Ibid. vol. xxxvii. p. 57.
[4] *Wirth.* Op. cit., p. 298.
[5] Breslauer Samml., vol. xxxvi. p. 556.
[6] *Rutty.* Op. cit.

able for great humidity throughout Europe, especially in the spring-time. In Italy it was particularly wet from September, 1728, till May, 1729, and the wine in the casks, it was remarked, began to ferment a second time and changed colour. Much injury done by the frost in Scotland, multitudes of cattle being buried in the snow.[1] About this time an *epidemic* catarrhal fever was spreading, and which travelled through Europe from east to west.[2] It was what is known in our day as 'influenza,' and was epidemic in Spain, where it was named by Pedro de Rotundis, 'un catarro sufocativo.' It must be remembered that Rutty says the epidemy was in Britain in December, 1728, and that horses had coughs and colds some months previously. In this year, its symptoms and progress were noted by Leow, who gives us a description of the diseases prevalent amongst the lower animals at the same time. '. . . . but also on account of this pestilence, which spread among the herds in all directions, in Italy, the Palatinate, Austria, Pannonia, Wallachia, Podolia, Volhynia, and Poland, innumerable putrid miasmata were diffused through the air, and thereby infected these and other places with the contagion. For although some asserted, and hence maintained, that unless they arrived at the source of the contagion on its first appearance, yet it was only plain, on the other hand, that a pestilence of horses must pass to horses, that of cows to cows, and of swine to the whole race of swine . . . . and in our time, the plague of herds, as in Hungary and Austria, in the months of October and November, 1729 (the influenza months), became a catarrhal fever, beginning with a disorder of the head, and within four days, either hæmorrhage from the nostrils or *per alvum* would set in, and terminate in stercoraceous vomiting. At the same time, a disease of a purulent nature, followed by gangrene, showed itself in wild boars. Nor is there any reason to doubt that the contagion lingered in mankind through famine.'[3] It was believed that the flesh of the diseased swine had conveyed the malady to the human species, and that the emanations from their bodies still further tended to spread the disorder. The epizoöty among the herds in the above-men-

[1] Philosophical Magazine, 1820. [2] *Gluge.* Influenza, p. 73.
[3] *F. Leow.* Historia Febris Catarrhalis, 1729.

tioned places destroyed immense numbers. Hahn speaks of a contemporaneous epizoöty, when describing the influenza.[1] Wirth says the disease amongst the cattle was Rinderpest; no doubt a correct opinion.[2]

A.D. 1730. A very wet year, so that the Thames inundated Westminster. Eruptions of Vesuvius, volcanic eruptions in Iceland and the Canary Islands, and an earthquake which nearly destroyed the whole of Chili. In Lancerote, one of the Canary Islands, the atmosphere, according to Von Buch, was so tainted by deleterious emanations during a volcanic eruption, that all the cattle were killed. 'Dead fish floated on the waters in indescribable multitudes, or were thrown dying on the shore. The cattle throughout the country fell lifeless to the ground, suffocated by putrid vapours, which condensed and fell down in drops.'[3] A formidable epidemic disease commenced at Cadiz, named the black vomit ('*el vomito negro*'); it was supposed to have been brought thence from South America, and extending over the continent, continued its ravages until 1738, when a murderous dysentery invaded the coast of Malaga and Seville, and, indeed, all the sea-board of Andalusia. During the prevalence of this pestilence animals were first affected, especially those that were domesticated; birds which fed on grains also suffered severely, such as poultry, pigeons, &c. Numerous insects, called by the Spaniards 'largostus,' were generated previous to the breaking out of this epidemic disease.[4]

During the years 1726-7, the Cattle Plague still prevailed in Russia, Livonia, and Courland. In the year 1728, it contrived to extend itself beyond these countries by being introduced into the March of Brandenburg;[5] and in 1729 it was spread over that country and Austria,[6] where it continued until 1730, when it appeared in Saxony.[7] In Frankfort-on-the-Oder, it was observed and described; and in this year, also, it was

[1] *Hahn.* Buechner, Miscell. 1729, p. 765. [2] *Wirth.* Op. cit., p. 184.
[3] *Sir C. Lyell.* Principles of Geology, p. 437.
[4] *Dr Bascome.* A History of Epidemic Pestilences. London, 1851.
[5] *Lorinser.* Rinderpest, p. 18.
[6] *Gohl.* Von den in der Mittelmark, 1729-31, grassirenden Viehseuchen. Leipsic, 1741.
[7] *Börner.* Inst. Medic. Legalis, p. 124.

pursuing its truly desolating course over Istria, Friuli, and the Venetian States.[1] This is undoubtedly the disease mentioned by Leow for the last year.

The most notable authorities who have treated of this invasion are the two physicians, Andrea Goelicke [2] and Jean Bruckner,[3] who studied it at Frankfort. In the preface to the work of the first of these celebrities, its previous inroad is alluded to; after which he gives the following account of the plague: On the 28th September, 1730, two diseased animals were opened, one just slain, and the other recently dead; and on the 7th December, he opened two other large-sized beasts, one that had been ill for some days from the malady, and was killed, and another that had died. From the examination of these cases, it was ascertained that the disease was localized in the intestines, which were found black and sphacelous. Other people had assured the writer, that instead of bile in the intestines, they contained bloody matters.

In the cow that was killed, black blood flowed from the wound. A large quantity of yellow serosity was found in the cavity of the abdomen, and but little alteration was noted in some of the viscera; the gall-bladder was three or four times its natural size, and filled with a green bile of a most disgusting odour. The small intestines were slightly inflamed, and the lining membrane covered with this bile; the *reticulum* (?) contained much food, which looked as if baked. On the tongue were observed many pustules containing an ichorous and fetid humour. The stench was insupportable, and almost forbade an examination.

In an ox which had died of the malady, the small intestines were gangrenous; they contained a quantity of a substance similar to hog-wash or broken-up flesh. With the exception of a little softness, perhaps, the other viscera were healthy; though the gall-bladder was of great size, full of yellow bile, and there was a great quantity of disagreeable matters around the mouth and the nostrils. According to the accounts of those who took care of

[1] *Bottani.* Op. cit., p. 147.

[2] *A. O. Goelicke.* Med. de Lue Contagiosa Bovilium genus depopulante. Francof. 1730.

[3] *Haller.* Dissertations, vol. v. p. 713.

the animals, the disease began by a general horripilation and dulness, with low hanging head and drooping ears, succeeded by a corresponding febrile heat. Thirst was very great; the excrements of the two first days were hard, but on the third day a violent diarrhœa set in, which was so intense, that at each step the animal expelled matters similar to the washings of flesh, and everything extruded in this way had a most fetid odour; so fetid, indeed, that healthy animals testified by their bellowings how disagreeable they were. The eyes became inflamed and nearly closed; the mouth and nostrils exhaled a repulsive smell; the tongue began to be excoriated, and rumination was entirely suspended. Some breathed as if in pain; others were tranquil, though the respirations were quickened; all had the flanks drawn upwards; deglutition was nearly impossible. Some died on the fourth day; others survived till the seventh day. Milch-cows yielded no milk, and those which were in calf aborted. The young cattle, the bulls, and all fat stock were more quickly affected by the contagion, and died more rapidly than the lean, the old, or the hard-worked beasts. The cows which aborted for the most part escaped; a circumstance which induced the cow-leeches to give medicines to produce this effect, and thus to save these creatures. The belief was a fixed one, that the disease was propagated by the cattle of other countries. Reviewing the different descriptions given by Lanzoni, Lancisi, and Ramazzini, the Doctor then passes on to his own observations.

Going over all the phenomena which had been noticed, they are attempted to be analyzed and explained; and from them is deduced the proof, that the disease is due to a miasma of a most subtle and contagious nature, which penetrates by the nose and the mouth, and is spread all over the body with the speed of lightning. The blood, it was remarked, had a lesser tendency to remain fluid than to coagulate; and cattle when diseased and killed by the butcher, bled very little; thus was the blood in the same condition as in malignant fevers. Reasons are given for naming the disease 'a fever, of a malignant and inflammatory kind,' after the example of Ramazzini. This fever is most acute, and animals promptly die; some were even noticed to perish suddenly, as if struck by a thunder-bolt.

It was wonderfully contagious, and did not exercise its ravages all at once, but suceessively, invading kingdom after kingdom.

It was transmitted in different ways; sometimes one ox gave it to another; at other times the clothes of men carried the pestilential miasma; and if healthy animals breathed the odour from the fetid dejections of those which were diseased, they became affected. Those people who kept their cattle shut up and perfectly isolated, preserved them from the contagion. The proofs were convincing that this ferment or contagion altered, in a remarkably brief space of time, the solids and fluids to such a degree that they became a mass of corruption.

It was useless labour to attempt to discover the cause of the malady in the malignity of the stars, the corruption of the air, inundations, wars, or other similar calamities. It is asked what kind of malady the stars were likely to produce, and why mankind, who lived under the same unpropitious influences, escaped with no damage. Ramazzini laughed at these absurdities, and with reason; for having in his youth read the essays of Pic and Mirandole, exposing the astrologers, he never afterwards troubled himself to form his opinions on their studies. Those who maintained that this disease was due to other sources, had a difficult problem to resolve; and it was not easy to reconcile the different phenomena observed, with the causes assigned by the majority of the physiologists. For example, how was it that the malignity of the air and unhealthy pastures only affected the bovine species, and spared all the other animals living under the same sky, breathing the same air, and living in the same pastures? Or how did an unhealthy dew, which affected immense pasturages, only give the plague to one ox, which communicated it to all the others it came in contact with? Solve, who can, these questions! These so-named causes being known, we cannot hazard a doubt but that they will produce general diseases amongst many kinds of animals. And it has been sufficiently proved already that this disease of cattle came by contagion. In the face of all the various hypotheses, there was the positive fact of the existence of a miasm or contagious ferment, which was capable of corrupting the humours, and of giving rise to the same malady in other cattle by communication. Those who attributed it to a para-

sitic corruption of the blood, only sought to revive the absurd hypothesis of Kircher, which had been for a long time abolished. At all times the disease was exhibited with but little variation of symptoms, and it was indeed a real pest of cattle. With regard to treatment, the most celebrated physicians who have thoroughly known the nature of the disease, have freely confessed that to this day there is no specific or certain means of cure. God only knows, and we have too often seen, that numberless hurtful modes of treatment have been resorted to. Add to this, that the method employed for diminishing or driving away the disease is entirely empirical, and founded on no sound indication; although common sense demands for the cure of animals, as well as for man, that the principles of medicine shall be equally followed out. But all the difficulties experienced in human medicine are greatly augmented by the difference in organization of ruminant animals, when compared with that of man, or even of other creatures. Although these difficulties appear very great, yet it is to be hoped that a system of treatment may be established on a more certain and a more reasonable basis, than that pursued by the empirics.

The symptoms observed show that the animals take the disease by the mouth and the nostrils, and very rarely by the skin. For these reasons, two great indications must be followed out. The first is, that the pestilential poison admitted into the mass of the humours ought to be thrown out as speedily as possible. The second is, that it ought to be expelled with the greatest promptitude by the salivary glands before it has had time to commit great ravages. In the first case, benzoic and alexipharmic remedies should be employed; and in the second, medicines which induce salivation. Much has been said for and against bleeding. Ramazzini, in condemning it as dangerous in all epidemies, yet believes it useful and salutary in this epizoöty of cattle, for the reason that, as at present, he recognized the inflammatory nature of the disease, inasmuch as the poison is one of those which have power to coagulate the mass of the blood. Bleeding, however, is not sanctioned by experience; and it is wiser to agree with Lancisi, who regarded it as a very dangerous mode of cure.

The disease is accompanied very often by diarrhœa, of which

the effects are as deadly as the poison itself. Purgatives, above all those of a drastic kind, augment the disease; neither is it altogether safe to prescribe aloes and the other purgatives. Anodyne injections, composed of emollient herbs boiled in milk, are the best agents for acting on the bowels. The first indication, which is to expel the poison, is fulfilled by using alexipharmics not too heating, but temperate; such as the pimpernell, angelica, germandria, &c. Many have committed a great error in exposing the diseased animals to the cold, and the wind and rain, when they have been separated from those in health; instead of keeping them in well-closed comfortable stables, covering them with sacks of straw and of hay, in order to assist them in expelling the poison.

Setons in the necks of the animals were useful, but blisters were injurious. The most preferable treatment was to cauterize the skin with a hot iron, and thus to form artificial ulcers by which the *materies morbi* might escape.

It could not be understood why some practitioners should employ febrifuge medicines, such as quinine, in quelling the malady. This remedy had doubtless been maintained by Ramazzini, in an elegantly-written discourse which he had delivered in the University of Pavia on the diseases of cattle, to be the most efficacious. Yet it was necessary to avow, that in continued inflammatory fevers of the kind to which this epizoöty undoubtedly belonged, this remedy did not shorten their duration. But it was still a most useful medicine, and its beneficial action was always the more prompt in large doses. The giving vermifuge medicines, in accordance with the hypothesis of Kircher's living corruption, was very wrong; and much more blamable were those who recommended sympathetic remedies,—preservative as well as curative. These consisted in taking a diseased animal, digging a deep pit, throwing it in and then covering it up, with the notion that by this means the disease, then spreading abroad, soon loses its virulency and ceases,—a custom too absurd and superstitious to demand a moment's consideration. Daily experience proves the utter inefficacy of medicines to cure the disease, and we ought to put no faith in them as preservative agents. Assuredly the best results will be obtained from extreme

vigilance in observing and enforcing sanitary laws, the effect of which will be far more enduring and profitable than preservative remedies. Columella's injunctions should never be neglected —separate the healthy from the unhealthy.

It is absolutely necessary that all communication should be interdicted. No straw, hay, sacks, or other articles should be carried from the infected regions; the veterinary surgeons, attendants, dogs, and everybody and everything capable of transporting the virus, should be kept away from the healthy cattle. Lancisi was not slow to aver, that the most certain way to suppress the contagion was to break off all communication, direct or indirect, with the infected. We know with what negligence the edicts of kings and princes are treated in all that concerns salubrity and the watching of roads. Those who infringe these edicts ought to be severely punished, as well as those who do not bury deep enough the bodies of those beasts which have perished. Dogs and wolves may, in these instances, disinter the carcases and scatter abroad the corruption; thus occasioning malignant epidemic fevers.

When the animals begin to recover, they ought always to be left for eight days in their stables, and their diet should be very light and plentifully diluted with water. The air should be purified by preparations of incense, laurel, hyssop, and juniper leaves. The walls of the stables should be thoroughly cleansed, and the bodies of the animals should also be well washed with vinegar before allowing them to rejoin their companions at pasture. Time may enable us to discover more efficacious means than those which we have proposed to avert this contagion of cattle, and which has for so long a time ravaged nearly the whole of Europe.

A.D. 1731-2. The winter of 1730-1 was cold and dry, the summer hot and dry. In March, a severe shock of an earthquake, and in July another in China. In 1732 the winter was mild, the spring wet, and the summer hot and damp. Pestilential fever killed 1500 persons in one week, in London, during the month of April. Droughts were prevalent, and during these years the *Aretia Phœorrhœa*, a particular kind of moth, was so numerous in France that people were alarmed. The oaks, elms,

and whitethorn hedges seemed as if they had been scorched by some burning wind. The fruit trees were also destroyed by them, and all the fruit devoured. To such an extent did they ravage everything, that parliament issued an edict compelling people to destroy them; but this measure would have been ineffectual, had not some cold rains so cleared them away that scarcely one could be seen.[1]

In February and March 'strangles' (*morbus anginosus*) was very frequent amongst horses in England, and killed a good number.[2]

One of the most remarkable epizoöties of glossanthrax (*chancre volant, fliegender Zungenkrebs*) on record occurred in these years. It reigned in France, Switzerland, Germany, and Italy, and was believed to be caused by the immense quantities of caterpillars which were observed everywhere. Scheuchzer[3] puts this opinion on record, and very ably describes the disease. 'This consideration leads us to the caterpillars, which, it was observed, in the past year, had in immense numbers spread themselves in the woods and over the trees, to the great injury of the same: their nests remained upon the trees and hedges throughout the whole winter. It was here and there thought that the blight which fell in 1730-31, and the subsequent continual swarms of insects, had most to do with the production of this disease. In the Canton of Berne, they also attributed the origin of the malady to caterpillars, and a circumstance arose which seemed to support this opinion. A man happened to dry his shirt, which was damp with perspiration, over a fire in which wood covered with caterpillars' nests was burning. Afterwards he put this garment on, but soon became swollen and died. As a further experiment, a dog was wrapped in a similar cloth, and this creature also died. But it appears probable to us that the disease had made its appearance in the autumn of the previous year, and the following remarkable circumstance is worthy the notice of those who take the field against the caterpillars. In 1731, in the neighbourhood of Rüti, in Lower Andelfingen, in the cow

[1] *Reaumur.* Op. cit., vol. ii. p. 122.

[2] *Huxham.* Observations on the Air and Epidemical Diseases. London, 1758.

[3] *Scheuchzer.* Fliegender Zungenkrebs, eine Viehseuche, &c. Zürich, 1732.

pastures, everything groaned under the visitation of these insects, which fell from the trees and covered the country around; but not a single one of these cattle were attacked by the plague . . .

'Further, there is a circumstance which not unusually accompanies this disease, and which makes it more difficult to understand. All the intelligence we can gather, tells us that the contagion travels from place to place. From day to day it traverses a distance of from three, four, or more hours (the German hour or *stund* is reckoned about two miles), and reveals its presence by a peculiar murmuring sound, or a thick stinking mist. This curious circumstance is verified by tidings from several places, which would lead to the belief that the attack was made after a warning or signal of such a nature. I was assured by people, who were certainly terror-stricken and may have exaggerated, that a strong north-west wind blew over the whole country on the 3rd, 5th, 7th, 10th, 11th, 12th, and 14th of March, and that on the latter day the disease attacked the cattle at Merishausen and Neuhausen, in the Canton of Scaffhausen; also that the disturbance in the air was perceived at Niederweningen, in the village of Würenlungen, in Baden.' A long account is given of the various places where the peculiar noises in the atmosphere were heard, sometimes as a loud noise, at others as if caused by a flight of birds or bees; as soon as this sound was remarked the disease broke out. A dark cloud was noticed in some places, but a great amount of fable and superstition is mixed up with the whole description. The symptoms were well marked. Scheuchzer has the following: 'Where only a few small red, white, yellowish, or black-coloured vesicles are observed on the tongue, the animal should not be immediately slaughtered, but should have the organ washed with detergent lotions. At a later stage of the malady, white, yellow-white, reddish-yellow, and yellowish-black vesicles of the size of peas or beans, and which have the appearance of pustules growing deep in the tongue and projecting from it, are apparent; these contain, beneath a dense skin or envelope, a thick, viscous poisonous matter, which distends them. Occasionally, there were large yellow bladders filled with fluid material, and which, when allowed to remain, ate deeper into the tongue; but when these cysts were opened, the yellow

acrid liquid escaped. In some cattle, white, yellow, and black fissures appeared towards the root of the tongue, and here and there little hairs were observed growing in them (these were probably portions of hay or other matters, which often lodge in wounds of the tongue, especially in the horse). All the cattle had the disease confined to the tongue, but horses had these vesicles form upon their sheaths as well as on their tongues, and the mares about their sexual organs; not unfrequently they also showed themselves under the mane, and towards the rectum. It was remarked that cattle, which one day would have the disease on the upper part of the tongue, had it the next day on the under surface, and that there it was far more active in its erosive effects. In one case at Dielstorff, the cow's tongue was covered with vesicles or small-pox (*kinder-blattern*), and after the scraping operation, it was black and dead-looking, but even this animal recovered. It was generally observed, that where the disease was neglected or improperly treated, in a very few hours it assumed the characters of malignant carbuncle. As a testimony to the virulence of the malady, it may be mentioned that in those cases death took place in twenty-four hours, but not before the tongue had sloughed out. Otherwise it was noticed, strange to say, that the infected beast did not lose its appetite, but did its work, and performed all its ordinary functions—a circumstance which distinguishes this from all other cattle plagues.'[1] The rate of travel of the contagion, the villages and towns attacked, and the various kinds of animals affected, were all carefully noted. The most striking feature of the epizoöty was its uniform rate of advance, which could be calculated beforehand with certainty. In Switzerland, it is mentioned as follows—'The winter of 1732 was very mild, and the spring was early . . . . . in the spring, a sickness among the cattle showed itself with vesicles on the tongues, and which, if not immediately opened by means of a silver instrument, and cleansed, then these organs became so corroded or eaten away, that the animals died in twenty-four hours. This disease passed through Wurtemberg, Suabia, Switzerland, and into Italy, remaining but three or four days in one place. But

[1] *Scheuchzer.* Op. cit., p. 30.

few therefore died, and these only the animals which were neglected.'[1] Trumpy writes: 'In the spring of this year, there came from Suabia into Switzerland a deadly disease, which was called the 'flying cancer' (*fliegende krebs*—glossanthrax). It was a malady characterized by bladders on the tongue. If the cattle were left without medical aid and attention, these bladders soon became red, then black, the tongue fell off, and the cattle perished. With us a few died, but the measures taken to cure it were very prompt. The disease was transmissible to mankind; as a consequence, the butchers' shops were closed, and the milk of infected animals was thrown away. As the affection disappeared from this and the neighbouring localities about the end of April, all the strictly guarded passes were open again, and free intercourse allowed.'[2]

With regard to the progress of the disease, we find that in the spring of '31 it was observed in Dauphiné, Haut-Faucigny, Auvergne, and Bourbonnais, and in the neighbourhood of Moulins and Gannat it prevailed in April.[3] Textor says: 'Towards the end of April, 1731, this disease appeared, among other places, in Strasbourg, in the district of Gannat, belonging to the généralité von Moulin. Two repeatedly printed decrees were published and sent the same year to all the village officials in Alsace.... This disease is supposed to have originated in Germany in the year 1682, and thence spread itself through the Netherlands; but in the month of April, 1731, it again appeared in the district of Gannat, and from that place it extended to the Netherlands (through various Rhine districts); so that the malady travelled from south to north at the rate of four miles a-day, over a strip of country about forty miles in width, generally remaining from two to three weeks in one locality, but sometimes entirely avoiding certain villages.'[4] On the 22nd of June, the Municipal Council of Geneva published its preservative and cura-

[1] *Walser.* Appenzeller Chronic. p. 531.

[2] *Trümpy.* Glarner Chronic. p. 531.

[3] Observations sur une Maladie qui attaque les Bêtes à cornes, &c. Mercure, Histor. et Politic. January, 1732.

[4] *Textor.* Versuch wie die Viehseuchen wohl erkannt, &c., werden können. Tübingen, 1767.

tive measures. The malady had then extended from France to the banks of the Rhine, and was observed at Frankfort and in the duchy of Nassau in the month of January, '32. On the 4th of February it was at Wallsdorf, in the country of Idstein and Nassau; and on the 5th was in the bailiwicks of Limburg and Wehen of that duchy.[1] At the same time it was extending in the north of France, and indeed had become general over the whole kingdom, where it was named *maladie de la langue, vessie à la langue, mal de langue, charbon, chancre volant*, &c. At Languedoc, in the south, Sauvages noticed it: 'This plague, which came through France, attacked and slew horses, oxen, and mules, as well as men, at Nemausi (Nismes), in 1732. Its symptoms were a carbuncle at the root of the tongue, so that the whole organ was gradually eaten out in a few days. The attacked quickly succumbed, because, besides fever and want of strength, there was complete prostration of functions.'[2] This celebrated author was, I think, the first to give it the name of 'glossanthrax.'

In the 'Maison Rustique' will be found various records of this visitation in France. Its manifestations were similar to those of the epizöoty of 1682; consisting, first, in the appearance of a vesicle on the tongue, occupying sometimes its base, sometimes the upper part, and at other times the sides of this organ. This vesicle was primarily of a white colour, then it became red, and in a very short time it assumed a livid or black hue. Then it began to increase considerably in size, burst, and became an ulcer of a chancrous character, which penetrated the whole substance of the tongue, and caused the death of the animal. So prompt was the course of the malady, that sometimes in less than twenty-four hours from its commencement it had passed through all its stages. There was no external sign to announce its existence when an animal was first attacked; nothing but an inspection of the tongue could reveal its presence; and the most astonishing feature of the disease was, that the creature could eat, drink, and perform all its ordinary functions, until the tongue fell to pieces. It was remarked in 1731, that horses withstood the epizoöty better than horned cattle. Its origin was attributed

[1] *Franque.* Op. cit., p. 122.
[2] *Sauvages.* Nosolog. Methodica, ed. Daniel., tom ii. p. 249.

in 1731, to the dryness of that year, which compelled the herbivorous animals to eat the leaves of trees, and these were covered with caterpillars. The disease was very contagious, and was communicated not only by the immediate contact of the humour exuding from the sore, but even by the instruments employed to dress the ulcers. The most successful method of treating the malady was to scrape, with any silver instrument, the vesicle as soon as it appeared, and then wash the tongue with a decoction of garlic, salt, pepper, and asafœtida in vinegar, according to the Hippocratian maxim: *malignorum remedia sunt lac, allium, vinum fervefactum sal et acetum.* When the margin of the ulcer became hard and callous it was dressed with oil of vitriol.[1] In Italy, where it was designated the *cancro volante*, it extended as regularly and rapidly as elsewhere; and, particularly in the Venetian States, caused much alarm. It reached Ferrara and the Romagna; attacked horses, cattle, sheep, and pigs; and altogether disappeared in that country in 1732.[2]

It has been regarded as somewhat singular that the malady did not extend more towards the north, nor towards Lower Germany. That it did not enter the latter region, there is the positive testimony of a contemporary writer, Engel.[3]

Towards the end of 1732, a very general epidemy of influenza overspread nearly the whole of the known world, traversing it from east to west, according to Gluge.[4] It was observed in Edinburgh in December, and in England at the commencement of January. Horses and other animals were much affected with disease before, or coincident with, the appearance of the malady. Dr Arbuthnot describes the meteorological conditions of these years in the following terms: 'There have been of late two remarkable instances of the influence of the air in producing an epidemical disease, perhaps over the greatest part of the surface of the earth; the first happened in the year 1728, the last in the latter end of the year 1732 and beginning of 1733, which, being

[1] *Liger.* La Maison Rustique. *See also* Réflexions sur la Maladie du Bétail, p. 169.

[2] *Bottani.* Op. cit., p. 151. *Muratori.* Annali d'Italia, vol. xii. p. 182.

[3] *Engel.* De Brutorum Morbus. Rintellii, 1733.

[4] *Gluge.* Influenza, p. 81.

the most recent and remarkable, I shall give a short description of it, till a more particular one can be procured from the collected memoirs of the several countries which it invaded, of which I have seen only a few.

'The previous constitution of the air was, in England and in the greater part of Europe, a great drought, which may be inferred from the failure of the springs, in the abatement of the fresh water in all its usual currrents and reservoirs, which are the best measure of the quantity of moisture falling from the clouds. What is most generally taken notice of in the accounts I have seen from Germany, France, and some other places, was, that the air in the beginning of winter, especially in November, was more than usually filled with thick and frequent fogs, the matter of which was not precipitated on the earth in rain, snow, or any other beneficial dispensations. Fogs are so usual in this country in November, that there was nothing particular observed about them that I know of. But there was hardly anything fell from the clouds during the month of November, except a very small quantity of snow, attended with a frost of no long duration; and this was all the winter we had. In the northern parts of France there was a very small quantity of snow, which lasted from their 15th and our 4th of November, till after Christmas. This was succeeded by southerly winds and stinking fogs, during which there was observed, by some chirurgeons, a great disposition in wounds to mortify. Both before and during the continuance of the disease in England, the air was warm beyond the usual temper of the season, with great quantities of sulphureous vapours, producing great storms of wind from the south-west, and sometimes lightning without thunder.

'As to the time of invasion of the disease, it was different in different countries. It invaded Saxony and the neighbouring countries in Germany about the 15th of November, and lasted in its vigour till the 29th of the same month. It was earlier in Holland than in England, earlier in Edinburgh than in London. It was in New England before it attacked Britain; in London before it reached some other places westward, as Oxford, Bath, &c.; and, as far as I can collect from accounts, it invaded the northerly parts of Europe before the southerly. It lasted in its

vigour in London from about the middle of January, 1732-3, for about three weeks. The bill of mortality, from Tuesday, the 23rd, to Tuesday, the 30th of January, contained in all 1588, being higher than any time since the plague. It began in Paris about the middle of their February, or the 21st of our January, and lasted till the beginning of their April, or the 21st of our March; and I think its duration was longest in the southerly countries. It raged in Naples and in the southern parts of Italy in our March. The disease, in travelling from place to place, did not observe the direction, but went often contrary to the course of the winds. . . . . It was matter of fact that there was a previous ill constitution of the air, noxious to animal bodies. In autumn, and long afterwards, a madness among dogs. The horses were seized with the catarrh before mankind; and a gentleman averred to me that some birds, particularly the sparrows, left the place where he was during the sickness.'[1] A medical society in Edinburgh gives another account of it: 'This epidemic distemper, above described, spread itself over all Europe, and also infested the inhabitants of America: so that it was, perhaps, the most universal disease upon record. The first accounts we have of anything like it this last year in Europe was in the middle of November, from Saxony, Hanover, and other neighbouring countries in Germany. It raged at the same time in Edinburgh, and Basil, in Switzerland. It appeared in London and in Flanders after the first week in January, towards the middle of which it reached Paris, and about the end of the month Ireland began to suffer. In the middle of February Leghorn was attacked, and near the end of it the people of Naples and Madrid were seized with it. In America it began in New England about the middle of October, and travelled southward to Barbadoes, Jamaica, Peru, and Mexico, much at the same rate as it did in Europe.'[2]

To our celebrated countryman, Gibson, we are indebted for a really excellent description of the affection as it was observed

[1] An Essay concerning the effects of Air on Human Bodies, by *John Arbuthnot*, M.D. London, 1751, p. 193.

[2] Medical Essays and Observations, published by a society in Edinburgh. 3rd edit. vol. ii.

in the horse. 'About the end of the year 1732, there was a very remarkable distemper among the horses in London and in several other parts of the kingdom. They were seized suddenly with a vehement dry, sounding cough, which shook them so violently that some of them were often ready to drop down with hard straining and want of breath; their throats were raw and sore; many of them had their kernels (submaxillary glands) swelled, and painful to the touch. For the first two days, most of them refused all manner of food as well as water, and had so many other bad signs, that when this distemper first broke out, many were afraid of a mortality coming among them; and, indeed, the only good sign they had was the vehemence of their cough, that both kept their blood in motion and speedily set them a running at the nose, which generally began the third day; and continued in so profuse a manner for five or six days, that some of them in that time discharged as much as two or three pails would hold of purulent matter, which, however, was generally of a laudable colour and good consistence. While the running at the nose continued they would not feed much, though their appetites were craving, because the matter mingled so much with their food as to render it altogether disagreeable, so that they lost their flesh exceedingly; but this loss of flesh proved a benefit to them rather than a detriment, and as soon as the running abated they ate voraciously and soon recovered their flesh. This distemper, though no ways mortal, yet was so very catching, that when any horse was seized with it, I observed those that stood on each hand of him were generally infected as soon as he began to run at the nose, in the same manner as the small-pox communicates the infection when they are upon the turn. While this sickness lasted, above a hundred of the troop horses under my care were seized with it. I always caused the sick horses to be removed from the sound as soon as they were taken ill, and put by themselves, as in an hospital. And in one troop of Horse Grenadiers we filled a stable of thirty-six standings in three days; an infirmary of five standings, and another of eighteen standings, in three or four days more; nevertheless, all of them recovered in a short time. Also many gentlemen's horses, where I was concerned, did well without any remaining

taint from the distemper; and it was observable that some who had been subject to a dry cough before this sickness, continued more free from it for some time afterwards. . . . . The horses that chiefly escaped the distemper were those that had been kept in constant strong exercise, or full-aged old horses, many of which were no ways infected, though very much exposed to it.'[1]

A.D. 1733. Famine and swarms of locusts in Germany. 'The flights of locusts increased the general dearth by invading various localities hitherto unvisited. In these places they remained for some years. This was the case with the Eastern locusts particularly, which in this year came from Tartary and settled themselves in several provinces of Germany, where they lingered until 1739.'[2]

A.D. 1734. Epidemic fever (scarlatina?) in England and Scotland. In July Huxham says, 'Many birds died whilst moulting.' For August he observes, 'Many song-birds have perished, and cicadæ are very seldom heard. The summer was more overcast, colder, and lately more rainy than usual. Every place was covered with water and mud.'[3]

Short writes: 'In August a nephritic colic, or stoppage of urine, was frequent among horses, of which they died in two days, if not quickly bled and purged freely. A horse, when near his end, ran his head against the wall or ground with his greatest force, and thrust till he died.'[4]

An epizoöty amongst horses in England and Scotland, which Heusinger thinks may have been scarlatina, or, at any rate, an exanthematous fever; because Huxham, for this period, describes an epidemy which has certainly much resemblance to an affection of that kind. Short, however, does not mention any particular disease as present in the human species for the year. Gibson again affords us a description of the symptoms of this equine disorder. 'About two years after this, in 1734, another epidemical distemper happened in the spring, that proved more fatal than this, though by reason of its short continuance it was

[1] *W. Gibson.* A New Treatise on the Diseases of Horses. London, 1754, vol. i. p. 375.

[2] *Asso.* Y del Rio von den Heuschrecken. Rostock, 1787, p. 7.

[3] *Huxham.* Op. cit., p. 96. [4] *Short.* Op. cit., vol. ii. p. 226.

much less taken notice of than the first. In the one, the horses coughed so vehemently in the street, and many of the hackney-coach and cart-horses that were obliged to work, had their noses in so nasty a condition, and so much exposed to open view, that they could not avoid being seen by everybody. But this other distemper was not so universally talked of, though vast numbers were seized with it, and some died suddenly. They were seized with a very hot, burning fever, and their flesh seemed so sore and tender that they could scarce bear to be touched. They were generally costive, staled but little, and that with pain and straining, and of a very high colour. They refused all manner of sustenance, and were so extremely sick that they would not drink, neither did I perceive any of them offer to lie down till their distemper came to a crisis. Upon treating them with cooling and opening medicines, with plentiful bleeding, they generally recovered. I was confirmed in this method by several symptoms that appeared upon the turn of the distemper, some of them having very hot and inflamed eruptions, which broke out in several parts, with blisters resembling St Anthony's fire, and some of them had large bags of water on the sides of their bellies, or towards their flanks, which the farriers called water farcy, but, indeed, was the effect of a very hot and inflamed blood.'[1]

In England, canine madness prevailed.[2] Rutty writes: 'Spring very warm (and so in England), but followed by a cold and nipping May, which hurted the fruits and burned the grass. In February there was a very great *rot* among the hares. In open winters there is a young spring of grass, which they and the sheep feeding on, it proves pernicious.'[3]

In October of this year, according to Albrecht, an epizoötic dysentery, accompanied by swelling of the head, attacked poultry, especially geese, in the neighbourhood of Coburg. They died with their bills open. In the grand duchy of Baden, gloss-anthrax was somewhat prevalent.[4]

A.D. 1735. Plague in Egypt amongst men. During the winter in North America, an epidemy affecting the throat and

[1] *Gibson.* Op. cit., vol. i. [2] *Webster.* Op. cit. [3] *Rutty.* Op. cit.
[4] *Wirth.* Op. cit., p. 362.

respiratory organs (*angina ulcusculosa*) nearly exterminated all young children. The weather was cold and wet. An epizoöty was prevalent at the same time.[1]

A most unhealthy year in England. In July, 'this season more like winter than summer; all garden fruits sour and unripe. Scarce a grasshopper to be heard or butterfly to be seen; many little singing birds die in casting their feathers.' August, 'Never was a wetter season at the time of year; many singing birds die; very little honey. Leaves fall off the trees as if autumn was past. Many mad dogs run up and down.' October, 'Many were bit by mad dogs.' November, 'Several mad dogs run about.'[2]

The weather for a long time, indeed, appears to have been most severe and trying for ruminants at pasture. For instance, Short writes in 1734: 'June 12. Began the long wet season, and continued mostly so to Feb. 2, 1736, viz. a year and eight months, after two years and nine months' drought.'[3]

An agricultural work, referring to 'the great losses that several farmers sustained by the most noted sheep rot of 1735' in England, remarks: 'This rot of sheep and lambs was the most general one, I believe, that has happened in the memory of man, because it rotted those deer, sheep, lambs, hares and conies, that fed on lands where rain-waters were retained on or near the surface of the earth for some time; and as I have elsewhere observed, the dead bodies of rotten sheep were so numerous in roads, lanes, and fields, that their carrion stench and smell proved extremely offensive to the neighbouring parts, and to passant travellers.'[4]

The affection appears to have been particularly severe in the Vale of Aylesbury, where one farmer lost 300 sheep within the year, and another sold 100 sheep in Leighton Buzzard market for sixpence each, rather than take them home again.

Rutty, who mentions hares being affected with 'rot' in 1734, in Ireland, observes of this year: 'It may, perhaps, be worth observing, that notwithstanding the excessive moisture

[1] *Hecker.* Op. cit., p. 248. [2] *Huxham.* Op. cit.
[3] *Short.* Op. cit., vol. ii. p. 225.
[4] The Shepherd's Sure Guide. London, 1749.

of the season, or rather the continued moisture of several seasons successively, yet that no general *rot* appeared among the sheep now nor for many years past.' Therefore, he argues, that the murrain or pestilence among cattle 'which invades sometimes this, sometimes that species of animals, is not from mere redundant moisture, but from other causes.'[1]

In this year the Cattle Plague was again introduced into Italy, but this time by war. The pest had not yet been extinguished in Poland or Germany up to this time, but was in all likelihood maintained in an active condition during the war for the Polish throne in 1733. Certain it is, that when Charles Emmanuel of Savoy, in alliance with France and Spain, commenced the series of military operations that resulted in the capture of the Milanese territory in 1738, the contagion was brought into Italy, which had scarcely begun to recover from the visitation of 1730. Austrian armies had invaded that country, carrying with them, as usual, Hungarian or Steppe cattle. It soon spread over the whole of Italy. A mandate, issued at Venice on the 9th of October, shows that it was then devastating Friuli, Bassanese, Trevigiano, and in the Conegliianese.[2] On the 3rd of December it had reached the provinces of Verona, Brescia, and Crema,[3] and on the 4th of January following, its dreadful presence was felt at Mantua and Milan. From thence it spread rapidly, and was soon carried over the Roman States, and into Piedmont, where it raged until 1739.[4]

Ulloa, who was a resident in South America from this year until 1746, is the first author who has told us of the existence of, and describes, the 'distemper' in dogs in that country.[5] Of its oftentimes prevailing in Peru in recent days we have ample testimony, but according to Rengger,[6] it is unknown in Paraguay, a fact sufficiently worthy of notice.

A deadly disease appears to have been prevalent amongst cattle in Scotland about this period. Dr Gilchrist, a phy-

[1] *Rutty.* Op. cit. [2] *Bottani.* Op. cit., p. 155. [3] Ibid. p. 161.

[4] For descriptions of this outbreak, see *Mazzuchelli.* Notizie Pratiche, &c. Milan, 1736. *Pascoli.* Delle Risposte, &c. Rome, 1736.

[5] *Ulloa.* Relacion Historica del Viage a la America Meridional. Madrid, 1748, vol. i.; also Noticias Americanas. Madrid, 1792.

[6] *Rengger.* Säugthiere von Paraguay, p. 156.

sician at Dumfries, in an Essay on 'Nervous Fevers,' notices it casually as follows: 'One thing I would not miss to take notice of here: the distemper so mortal amongst the cattle in this country, is a fever of a particular kind. I know of no medicine that has been of much service, either to prevent or to cure it. The most successful method to prevent it is, when the cattle are thought to be infected, or the infection near, to change the grass, by which they are purged, and this is the ordinary effect of new grass. We cannot think that it is owing to the particular qualities of the grass as a proper antidote that they are preserved, grass being much the same everywhere; but it must be from its purging quality, for if this visible effect does not follow, I'm afraid they will not escape. This suggests to us the use of purgatives in this disease of the cattle, which, amongst the many remedies handed about, and said to do wonders, is scarce ever thought of.' 'Having mentioned this disease of the cattle, a comparison might be made betwixt it and some fevers that have affected human bodies, so far as they may be found to proceed from the same first cause, viz. the *air* and *weather*. For some years the seasons have not been orderly. They have been unkindly, as they say. Warm open winters without frost, rainy summers and harvests, have been generally complained of. If by these a distemperature of the fluids is brought on, it will be kept up so long as the general course of the weather is the same.'[1]

A.D. 1736-7. The weather was intensely hot during the summer of 1736 in England, and gnats were so numerous all over the country, but more especially in the neighbourhood of Salisbury and Wiltshire, that they occasioned great annoyance. Flying in dense clouds, they sometimes were observed to ascend above Salisbury Cathedral spire. In 1737 there was an eruption of Mount Vesuvius and a comet, as well as some shocks of earthquake. Influenza in man in England in '36. 'A pestilential distemper made sad havoc of the cattle and swine in the south of Devonshire in October.'[2] In January, '37, catarrh-

[1] *Dr Gilchrist.* Medical Essays and Observations by a Society in Edinburgh. Edinburgh, 1737, vol. iv. p. 366.

[2] *T. Short.* Op. cit., p. 111.

al fever was still prevalent in mankind. 'Many horses had it at the same time, and died.'[1] In February, 'An anginous cough still among horses.'[2]

Wirth mentions epizoötic pleuro-pneumonia in oxen here and there in Switzerland, until 1739. The Cattle Plague devastated Piacenza and Lodi.[3] Convulsive ergotism appeared in mankind in Silesia and Bohemia (1736), and Antoine Soring, the historian of the epidemy, notices that it had been remarked, and the subject had been demonstrated by experiment, that spurred rye produces disease in fowls and mammiferous animals, and that when we know positively that animals are affected in this way during epidemies of ergotism, we may conclude that the rye is very rich in ergot, and its action very violent.

A.D. 1738. In this year the Cattle Plague had been carried into Upper Italy.[4] In England, in January, great floods drowned thousands of cattle. In July a fearful storm, of thunder, lightning, and hailstones, some of which were solid as ice, and from five to nine inches in circumference. Cattle suffered very much.[5]

When Steller, a pupil of the great Linnæus, was at Tobolsk, Siberia, in this year, there was an epidemy of pestilential carbuncles among the people; the disease was said to be so contagious, that healthy persons who approached the sick were seized with the malady. The plague had first shown itself in horses and oxen, and subseqently attacked the human species. It was reported that the cattle were affected in various ways,—some had suddenly set off running with all possible speed, and continued to do so, till they were quite exhausted and dropped down dead. On other cattle carbuncles appeared, which were dressed with a thin poultice, made of an herb mixed with yeast, whilst a large quantity of this herb was mixed with their food; by these means great numbers were cured. The herb is stated to have been the Centaurea, and is described by this botanist as follows: squamis ovatis, foliis pinnatis, foliolis decurrentibus linearibus, serratis et integris.[6] The wounds were sprinkled with

[1] *T. Short.* Op. cit., p. 112. [2] Ibid. Loc. cit.

[3] *Muratori.* Annali, vol. xii. p. 238.

[4] *Bottani.* Op. cit., p. 180. *Bianchi.* Relazione dell'Epidemia de' Buoi. Arimino, 1738. [5] *T. Short.* Op. cit., pp. 242, 243.

[6] Flor. Siberic., vol. ii. p. 89, Fab. 41. This is the same plant as that figured

powdered sal ammoniac, and healed speedily. Human beings were treated in the same way, except that they were made to take the herb in decoction, and it proved with them equally efficacious.[1]

A.D. 1739. In the beginning of this year the first great potato rot occurred in Ireland. It was believed to have been caused solely by the intense frost that began about Christmas, 1739, and continued until late in the following spring. 'At the conclusion of the year 1739, there happened an exceedingly cold winter, remarkable for a very severe frost, continuing until spring. From this dreadful and indescribable hard frost, there arose, shortly afterwards, not only a great destruction of all sorts of cattle, but a lamentable blight and calamitous rot of plants and vegetables of all kinds, for the very birds of the air and other animals used for human sustenance perished in great numbers from the excessive harshness of the cold season.'[2]

A.D. 1740. An exceedingly severe winter in England. 'Inexpressible was the damage done by this frost; for the rainy summer and harvest had caused a rot among sheep in low countries; and this storm starved and killed many in the high moors, so as in some parts scarce was there seed left to breed on. . . . . Many horses and much cattle were lost. . . . Spain was said to suffer near as much that winter by deluging rains.'[3] The barley and fruit crops were destroyed, and famine raged in many countries.

In Ireland, Rutty alludes to the severe frost of 1739-40, and the destruction of the potatoes, vast quantities of small birds and game, as well as fish. He also mentions sheep dying from 'rot,' and many from 'red-water' (sanguineus ascites); deer likewise perished in such numbers, that in the King's (Phœnix) Park, Dublin, out of 2000, 800 were lost. The rabbits suffered so severely, that they did not reach their usual abundance for nine or ten years after. He also says: 'The strand in the neighbour-

in the Hort. Lugdan. Batavorum, p. 89, Fab. 41, and called *Cyanus Floridus Odoratus Turcicus, seu Orientalis Major, flore luteo.* It is collected previous to its time of flowering, though the powder is made before the flower-stalk has appeared.

[1] *Gmelin.* Flora Siberica. Philosophical Transactions. 1753.

[2] *O'Connell's* Observations.

[3] *T. Short.* Op. cit., p. 254.

hood of Irishtown was famous for the quantities of shrimps caught there, but the great frost of 1740 destroyed them, and the few that are now (1776) found are neither so large nor delicate.'[1] Another authority in Ireland writes: 'March 11th. We have dismal accounts from several parts of the kingdom, that besides the great number of sheep which die daily, the wool peels off those that are living, and is scattered up and down the fields in such small quantities, that it will be impossible to gather it. April 15th. There is now as great a scarcity of provisions in the city (Dublin) as ever was known, and it is much to be feared all over the kingdom. Several thousand sheep have died in Connaught within the last two months.'[2]

During this and the two following years, great ravages were committed by a most destructive insect in many provinces of Sweden. This creature destroyed all the meadows by devouring every kind of herbage, except the foxtail grass.[3]

Petechial fever and malignant sore-throat were rife among mankind in England. In the month of May, Huxham writes: 'Violent cough, with sore-throat, oppressed horses and other animals in general. It often attacked a herd of neat cattle with such effect that only a few escaped. The sheep suffered very much from cough, and became emaciated and withered. Great numbers died, and their livers were found to be very greatly enlarged and schirrous; but the gall-bladder was enormously increased, and was turgid with black bile.'[4] The Cattle Plague had extended or broken out anew in Hungary, and passed into Bohemia and Bavaria.

From this period up to the end of the eighteenth century, it may be truly said that this bovine scourge was never absent from some part of Europe, and that the principal cause of its extension and perpetuation is to be found in the almost continuous wars occurring during the interval. We have seen that, in 1735, hostilities introduced it into Italy. The war of the Austrian Succession, on the death of Charles VI., in 1740, aided largely in maintaining and disseminating it; as the Hun-

[1] *Rutty.* Op. cit.
[2] *Pue's* Occurrences.
[3] Amoen. Acad., vol. vi. p. 17.
[4] *Huxham.* Op. cit., p. 232.

garians—who lent their assistance to Maria Theresa, the daughter of Charles—and the Austrians drew their supplies of cattle from Hungary. The movements of the hostile armies, accompanied, as they were, by infected droves, diffused the contagion far and wide, and rendered futile all attempts to suppress it at the seat of war. And at a later period, Frederick the Great, contending repeatedly with the armies of Austria and Russia, carried the pestilence about in his own dominions, or was the means of importing new sources from the adjacent countries. The principal of these irruptions will be alluded to in the order of their occurrence.

A.D. 1741. Very irregular seasons, and a cloudy summer. A most severe winter in America, where many cattle perished for want of food. In England, horses, cattle, and sheep died from starvation. Huxham again writes for the month of March, when people in England were suffering from catarrhs and anginas: 'Almost all horses, unless well taken care of in their stables, were affected with a purulent cough and mange, became emaciated and weak, so that many perished.'[1]

In Ireland, for February 17th, it is recorded: 'We hear from different parts of the country, that numbers of people daily die of fluxes and fevers, from want of proper food; and that there is great sickness among horses, of which numbers die, which people eat for want of other victuals.'[2]

'Tillage in the year 1740 was sadly deficient, owing perhaps as much to the despair of the people as to their actual sufferings; but whatever the cause, the effect was the same, and the year 1741 was even worse than that which preceded it. Horses, cows, sheep, pigs, and poultry, all were struck by the plague, and perished; and the mortality of the people must have been increased by feeding on the diseased animals. There were, also, it is said, shoals of dead fish cast on shore, on which the people also fed, but it is not believed that such food was unwholesome. The next harvest was plentiful, and it was said that, cows being very scarce, a sheep produced as much milk that year as a cow would in ordinary seasons. The year 1741 was always men-

[1] *Huxham.* Op. cit., p. 232.

[2] *Faulkner's* Dublin Journal.

tioned as *Bliadhain an air*—'the year of the slaughter.'[1] During the progress of a bill passed against forestalling and regrating, by the Irish Parliament, it was ordered that 'the committee be empowered to receive a clause to prevent persons from selling distempered cattle, knowing them to be so.'[2] Hughes states that many dogs went mad in Barbadoes during this year.[3]

A.D. 1742. Two comets were seen. The winter was long and cold. Epidemic influenza in England. For the month of May, Huxham reports: 'Not only were these rains most grateful in watering the fields, but also in destroying caterpillars. For the disease in vegetation was very severe at that time. And besides, it gently hindered the attacks on the crops of a new race of black caterpillars, for they grew healthy and abundant. These caterpillars came in vast crowds from the mountains like a torrent, and threatened to devastate the whole land.' In August there were 'innumerable wasps, tree-crickets or cicadæ, caterpillars, and many mad dogs.'[4]

Rutty remarks for Ireland: 'The cold and dry spring was attended with disorders not unlike those of the two preceding and cold springs, particularly colds, and chincoughs, and the measles were exceedingly frequent; the infirm, both old and young, and particularly the asthmatic, suffered greatly, and not less remarkably than did the vegetables during this sharp, cold season and prevalence of N.E. winds; and the cold affected not only mankind but the horses, and was fatal to several both here and in England, particularly at Plymouth, where Huxham observes that, in March, almost all the horses out of the stable had the mange and a purulent cough. The summer was more healthful than the spring, and the fever mentioned last year was far less frequent, and disappeared entirely in winter.'[5] For April, we are told that there was 'a most violent cold raging among horses, which killed many of them.'[6]

Upon the 26th of August, in Dublin, there occurred 'a sudden and great shower of rain, with great lightning, which killed the fish of all sorts in the Liffey, which came down the stream,

[1] Mr Curry to Dr Petrie, in pamphlet 'Famine in Ireland in 1740, 1741.'
[2] The Commons' Journal. [3] *Sir R. H. Schomburgh.* Hist. of Barbadoes.
[4] *Huxham.* Op. cit. [5] *Rutty.* Op. cit. [6] *Faulkner's* Journal.

floating in great shoals, and were taken up in great quantities as they were carried to the sea.'[1]

The Cattle Plague was imported into Lorraine and the Vosges.[2]

A.D. 1743. A cold and wet year. Meteors, earthquakes, and a comet. For three months before epidemic influenza began in man, the atmosphere was dense and humid, and on the 23rd of January there was a stinking fog. In this month Huxham noticed that 'very many stags died on all sides;' in February there was 'loathsome mange in horses, which has already lasted a long time;' in March, 'mange greatly disfigures horses, and some which are affected perish from emaciation, others perish from suffocation arising from cough and sore-throat.'[3]

The whole of the sheep in the territory of Arles, France, died from rot (*pourriture*).[4]

The Cattle Plague accompanied the army from Bavaria into Alsace, on the one side; on the other, it penetrated to France through Switzerland, entering Franche-Comté and Dauphiné.

Bovine contagious pleuro-pneumonia was prevalent in Suabia and Switzerland, according to Wirth.[5]

Dr Grant asserts that the French term *la grippe*, as applied to the influenza then reigning as an epidemy, was derived from an insect of that name, which was remarkably common in France during the previous spring, and which the people imagined contaminated the air.[6]

A.D. 1744. For Ireland, it is noted: 'The autumn of this year was uncommonly wet and cold, and much grain was spoiled in the fields all over the North of Ireland from which this year was called "The Rot Year." Provisions were scarce and bad the following spring, and a considerable mortality arose among the cattle from the bad quality of their food.'[7]

The Cattle Plague once more entered Italy, and again from two different directions. War introduced it into Piedmont,

[1] Dublin Gazette.
[2] *Bayard.* Diction. Vétérinaire de Buchoz, article Epizoötie.
[3] *Huxham.* Op. cit.
[4] *Hurtrel d'Arboval.* Diction. de Méd. Vétérinaire, vol. i. p. 249.
[5] *Wirth.* Seuchenlehre. Zürich, 1846.
[6] An Essay on Influenza. London, 1782. [7] *M'Skimmius.* Carrickfergus.

where, and in the adjoining countries to which it spread, it was most destructive; and it was at the same time imported into Venice. Germany and Holland were also invaded by the pestilence; but these invasions will be noticed more fully hereafter.

CHAPTER VI.

PERIOD FROM A.D. 1745 TO 1771.

A.D. 1745. In January there was a great overflow of the Liffey, especially about Dublin, where men and cattle were drowned. Rutty remarks, 'In March was a famine among the black cattle in the Co. Sligo and Roscommon; also oats and potatoes were very dear. In April there was a mortality among the black cattle, which was common to us and other parts of Europe, promoted greatly here, if not occasioned, by want of food and by bad hay. The horses also died in great numbers.'[1]

'A great fall of snow this year that smothered vast numbers of cattle and sheep, which caused a great many farmers to surrender their lands.'[2]

A.D. 1745-71. The year 1745 is remarkable in our record as that in which the 'Cattle Plague' was carried into England, Ireland, and Scotland (?) from the Continent of Europe, where, as we have already seen, it had been extending itself and causing an immense amount of destruction among horned cattle since the war for the Polish throne in 1733,[3] or since its supposed outbreak at the siege of Prague, Bohemia, in 1740.

[1] *Rutty*. Op. cit. [2] *Dutton*. History of Galway.

[3] In the *Journal de Trévoux* for May 1757, there is a letter from the Curé of Ypres, describing how, in 1735, a pestilential disease among cattle broke out at Ulm, on the banks of the Danube, where for a time it made great ravages; it was soon, however, stamped out by the care which was speedily taken to prevent all

In 1745, it appears to have reached Constantinople; for, according to Dr Murdoch Mackenzie, who was then residing in that city, there was 'a great murrain among the black cattle in Turkey,' in May of that year; and in the beginning of June 'there came immense swarms of butterflies, as well as caterpillars creeping everywhere. After this the plague raged severely in mankind.'[1]

I will briefly notice what some of the English writers have said relative to the pestilence in this country, and will then pass on to glance at some of the statements of a few foreign authorities; observing, however, that this not being a special treatise on the disease, I regret I cannot notice the subject more fully, and that much valuable and interesting matter pertaining to the epizoöty at this time must be omitted.

The malady was believed to have been introduced from Holland to England, either by two calves which a farmer at Poplar had sent for, in order to cross the breed of his cows,—or the contagion was conveyed by a parcel of infected hides from Zealand. Perhaps the disease had its origin from both sources; though it is certain that it first showed itself in the immediate neighbourhood of London, on the Essex side of the river; from thence it gradually spread through Essex and Hertfordshire, reached London, and once there, was not long in being widely propagated in every direction over the kingdom. It appears to be also certain that its introduction into Berkshire was due to two cows which had been purchased at a fair in Essex, after the disease had obtained a footing there.

There was nothing very noticeable in the temperature, nor were there any particular diseases prevalent in mankind when this plague commenced. The spring and summer had been rather *wet,* but the autumn was *dry and cold,* and the early winter *damp and cold.* The cows of the farmer who had bought the calves soon sickened and died; cases of a similar character quickly

communication between the infected and the healthy animals. France was then at war with Austria, and as cattle had to be collected on every side for the subsistence of the armies, this contagious disease was spread everywhere around. The curé above-mentioned thought the malady resembled somewhat the exanthematous catarrhal fever that he had seen attacking man.

[1] Philosophical Transactions. 1764.

manifested themselves in the neighbourhood, and the infection was carried far and near from these various and continually increasing centres. It is recorded that soon after the epizoöty declared itself in London, a disease broke out among the cattle in Argyllshire, Scotland, which killed six thousand animals. Whether or not this was the same affection, however, I believe there is no evidence to show.

Dr Mortimer is the first writer whom I can find describing the epizoöty as it appeared in London. His account of it is contained in a paper read before the Royal Society on the 21st November, 1745. He says:

'As to the distemper now reigning among the cattle, I am informed by the cow-keepers that a cow shall be seemingly well, and feed heartily, over-night, or in the morning, and give the usual quantity of milk; that in twelve hours' time they shall all of a sudden abate in their milk near half, and entirely fall off their stomach, so as neither to eat or drink, and then gradually lose all their milk. As soon as they perceive this they give them a warm mash of malt, or the following drench: "Take two ounces of caraway-seeds, boil them in a quart of water, and strain it; add a gill of white wine, and a quarter of a pound of honey." Their teeth are commonly observed to be loose,[1] for which they lance the gums and rub them with salt and vinegar. The very first day they have a huskiness, breathe short, and wheeze, but have no great cough; for which they have blooded them (in too small quantities), and rubbed their noses with tar, but with no success. Some hang down their heads, and run much at the nose, for which they lay a bag of scalding hot malt at their heads, tying it between their horns. This has sometimes relieved this symptom, but the beasts have not recovered. The second or third day most of them, not all, fall into a purging, groan much, and seem to be in great pain. The stools I have seen seem to be bilious, have cakes of jelly come away with them, and some were streaked with blood. They soon die after these stools come on. Those that are kept out in the cold air seldom live beyond the third day; those that are kept warm in houses and clothed, live five, six, or even

[1] This is the normal condition of the ox's incisor teeth.

seven days. Many of the cows I have seen have a wild stare with their eyes; the whites of the eye and the skin of the eyelids looked yellowish; their tongues looked white; they had an extraordinary heat in their mouths, at the roots of their horns (a place where they usually feel to judge of the heat of cattle), or in the axilla, or armpit, if I may so call it. The mucus running from their nose is very thick and ropy; their milk is thick and yellow. In the two I have seen opened, the flesh and blood looked much darker-coloured than usual. The fat of the first looked yellow; the lungs were much inflamed in many places, and had several large blisters, two or three inches over, full of water on their outward surface; there was no water in the thorax, little or none in the pericardium. The heart looked well, but the blood in it was not at all clotted, being exceedingly fluid and dark-coloured; the paunch was very full of food and greatly distended; the stomach looked well; the liver was full of schirrous swellings and chalky knobs; the gall-bladder bigger than usual; the gall fluid, but dark-coloured; the intestines inflamed in many places; the fat about the kidneys was distended with air; the kidneys were sound, as was the bladder and uterus. This cow was not with calf. On opening the skull there was much water gushed out. ' In the second cow the fat was not yellow; the lungs, heart, and stomach were like the former; the liver was pale, flabby, not schirrous, but the gall-bladder was very large; the intestines inflamed, and in some places livid; the fat of the kidneys in this was sound, but one of the kidneys was mortified. This cow was about a month gone with calf. The man who skinned and opened these cows said these were the general appearances in most he had skinned; only that in some he found water in the cells of the cores of the horns. They skin off the hide, which they say is good to tan, and they save the fat to make tallow of. The skinner told me that a poor man made a hearty meal of some stakes he cut off one of those cows, and that he was not sick with it (I am assured that a very sufficient experiment was made in our army in Flanders last campaign in favour of this).

' From these circumstances I think it evident that this distemper begins by an inflammation of the lungs, attended with a

catarrh or flux of humours from the nose; that in the progress of it there comes on an inflammation of the guts and a purging, which ends in stools tinged with blood, exciting great pain in the bowels, and so brings on death.

'Bleeding (in small quantities) has not been found effectual, nor in short any of the remedies yet made use of; therefore, having a chief regard to the ultimate effort of nature, which seems to be to carry off the distemper by an extraordinary discharge of gall, I hope the use of *crocus metallorum*, a medicine made use of with success in horses, and a great discharger of gall, as I have known its good effects in the jaundice of men, may be attended with success. I have therefore proposed to some cow-keepers to give to a cow, as soon as taken ill, one of the following *balls* (!) "Take *crocus metallorum* half an ounce (or more, according to the size and strength of the cow, or as the first dose is found to operate), in powder; make it into a ball with dough or crumb of bread moistened; give the cow a draught of bran and warm water after it, and repeat the draught after every purging stool." For the running at the nose, I am told, that pouring a pint of warm vinegar, with an ounce of salt, into the nostrils, has proved successful in making the cow sneeze and discharge a great quantity of thick yellow mucus and other matter from the nose, after which the cow recovered. For the shortness of breath, I have advised the giving "whale-oil, treacle of sugar, each a pint; flower of brimstone four ounces: give it in a mash of malt, or bran and water, twice or thrice a day." For the scouring, first give the *crocus* purge above mentioned; then give them every six or eight hours the following draught: "Take whiting one pound, bruise it; pour boiling water upon it, a quart or more; let it stand to settle; pour off the clear water and fling it away; then put a quart of warm water to the wet whiting, and add *bole armeniac*, in powder, two ounces, Venice treacle one ounce, English malt spirits half a pint." These proposals being founded upon the appearance of the symptoms, I hope they will be attended with the wished-for success.'[1]

FURTHER OBSERVATIONS.—'Since my former paper on this

[1] Phil. Trans., vol. xliii. p. 532.

subject I have had an opportunity of being present when three cows have been skinned and opened. The lungs in all were inflamed and blistered, and the guts in some places inflamed, in others livid, the gall-bladders exceedingly large. A collar-maker's man, who has been assisting in skinning above a hundred dead cows, assures me these are the general appearances in them all, except that in one he met with a large bag full of corruption between the bag enclosing the heart and the back-bone; in another he found the gall-bladder quite contracted and shrivelled up, having little or no gall in it, and in several he found schirrous knobs in the livers.

'Nov. 26. I desired Mr Hill, an ingenious apothecary in Westminster, to accompany me to see a cow dissected, and to help me examine everything very carefully, having got her drawn into a shed, to defend us from the weather. When the skin was taken off she appeared very fat; the muscles looked of a darker colour than usual. On opening the abdomen, the caul (*omentum*) appeared very fat; the paunch was greatly distended; on making a puncture, much wind rushed out; it had in it a great deal of food; the inside looked well and did not peel; the second and third stomachs, or the *omasum*, as also the fourth stomach, or *abomasum*, were almost empty, but looked well; the liver was firm, well-coloured, and sound, except a few schirrous knobs about the size of nutmegs; the gall-bladder was exceedingly large, and full of very fluid gall; the guts were inflamed in many places, the colon and cæcum livid. I had the curiosity to have them measured. From the anus to the insertion of the cæcum there were twelve yards (the cæcum was an ell long), and from the cæcum to the pylorus there were fifty-two yards. The midriff (*diaphragm*) was much swelled, inflamed, adhered in some places to the pleura, and almost wholly covered with bladders of water. There was no appearance of any inflammation on the pleura, or in either the internal or external intercostal muscles; the windpipe was inflamed greatly throughout its whole course, especially its inside; but the gullet, which lay so near it, was not in the least inflamed. The heart was of its natural size, the pericardium full of very fluid blood, probably from the bursting of some branch of the coronary

artery, caused by the extraordinary accumulation of blood in the right ventricle; for the vena cava and right ventricle of the heart were turgid and full of black coagulated blood, though this cow had been dead but twelve or fourteen hours; the lungs were likewise turgid with blood, but little or none was found in the left ventricle or aorta; the obstruction seemed to have been so great in the lungs that very little blood could pass through them from the right to the left ventricle of the heart, and therefore evidently evinces the existence of a confirmed peripneumony. All the membranes lining the nostrils, and the spongy bones thereof, were quite turgid with blood, and in the highest state of inflammation. The greater and lesser brain looked fair and well, seeming in no way distempered. I have not seen in any I have examined any cutaneous sores or exulcerations; nothing like the boils, carbuncles, &c., described by authors as the constant concomitants of plague in men; nor does there seem to be any attempt of nature to fling off the distemper by any internal imposthumation or discharge, unless by the running at the nose, and by the bilious stools, or bilious urine. The few which have recovered have been such as have been kept within-doors very warm; have been blooded once, twice, or oftener; have had warm mashes of malt and bran given them; and warm drenches of warm herbs, such as rosemary, wormwood, and ground-ivy, with honey or treacle, and have neither purged at all or but little; and when they have not purged at all, their urine has been observed to be as high-coloured as porter's beer.

'I am informed by the farriers and cow-leeches that a horse or cow will bear to have near two gallons of blood taken away without fainting. One cow I have seen, within about a month or six weeks of her calving-time, was taken with the running at the nose and the shortness of breath; the owner of her immediately took away out of the neck five quarts of blood by measure, and gave her a warm mash of malt once in six or eight hours; next day he cut her tail, and let her bleed two hours; the day after he took away two quarts from under the tongue, and so continued bleeding her at fourteen or fifteen hours' distance, for seven times. She did not purge at all; her urine was as high-coloured as coffee at first, but grew paler and paler

every time of bleeding; she soon recovered, now eats heartily, looks brisk, and has not slunk (aborted) her calf.

'The concern the cow-keepers are under for the loss of their substance, the various methods offered to them, and their want of judgment either to choose the most rational, or their want of accuracy in making experiments and following directions, is quite discouraging, and is the reason why none of them have pursued any regimen so steadily as to give one an opportunity of making conclusions from it; indeed, several own to me they are quite bewildered, not knowing which way to turn themselves, or whose advice to follow, what one says being quite contrary to the directions given by another. Some to whom I have given my directions have blooded once, have given the purge twice, but have not given the oily drench, or have given this once, and have not repeated it; others have given the chalky drench once, and not repeated it, and have not followed the other parts of my instructions; so that I am sorry to find that I can have no satisfactory experiments made. Yet, as the state of the disease seems to be so evidently a peripneumony, or inflammation of the lungs, windpipe, and nostrils, attended with a redundance of gall, I cannot forbear urging to the public the following method: "Give to all cows in general, while well, half an ounce or an once (according to the size of the cow) of *crocus metallorum*. As soon as a cow falls off her meat, give her another dose of *crocus metallorum*, and give her warm mashes of malt, bran, &c. When she runs at the nose, lay a bag of malt-meal, wetted with boiling water, upon the forehead and nose, tying it to her horns, morning and evening; pour warm vinegar and salt into the nostrils; if a short cough or difficulty of breathing comes on, bleed her one quart twice a day, for three or four days, and every six hours give the oily drench; if a purging comes on, give another dose of the *crocus metallorum*; if it continue, give the chalky drench every six hours; and if it does not abate in twenty-four hours, inject the same mixture by way of glysters; and if the husky cough continues with the purging, give the oily drench one three hours, and the chalky drench the next three hours."

'Most of the cows which have recovered from this distemper

recover their milk again as their appetites mend, but they are observed to have scabby eruptions come out in their groins and *axillæ*, which itch much, for a cow will stand still, hold out her leg, and show signs of great pleasure when a man scratches these pustules or scabs for her. I am informed that some cow-leeches had given *coloquintidæ* and salt of tartar, each one ounce, in a quart of warm ale; but I imagine it must be too griping a purge, and improper where the guts are inflamed. Indeed, I have not heard of any cows recovering which took it.

'As for the cause of this distemper, I am still at a loss. I think it cannot be owing to the food, because the cows which had it first in Essex eat only grass, turnips, and hay or straw; the cows about London eat, some grass; all, grains and hay; some, little or no grass, but live chiefly on grains, turnips, offfalls from the garden grounds, and hay. I am in doubt as to the air; the spring and summer were very wet and the ground very damp, the autumn was very dry and cold, the beginning of winter very damp and cold. The cows in Essex had the distemper in summer; it first began about London in autumn; it has spread itself equally among cows which have lain in the fields a-nights, and those which stood in stables or sheds; it spread itself in Essex, at first into such farms where they bought in strange calves, or lean cows, at market, which they did not know where they came from, but most probably from the hundreds where the disease first broke out; but how it got thither, whether by importing any cattle from Flanders, I know not, for surely there is too wide a tract of sea for any infectious miasmata to be wafted over to that part of the country by the winds! This is certain, the viscera concerned in respiration are the parts chiefly affected. Its spreading here in England has been progressive, and therefore one may reasonably think it is not constitutionary in the air, for then it ought to be universal everywhere; but that it is contagious, and propagated by infected cows being mixed with well cows, therefore the not buying-in calves or strange beasts, but every farmer keeping his herd by itself, must be a great means of preventing the propagation of it. And housing the cows a-nights may be a proper preservative against it.'

A third account was read by this gentleman on January 9th, 1746.

'During the Christmas holidays we sent for some milk, as usual, from the vineyard in St James's Park, none of the cows belonging to that house having as yet caught the distemper, though three had already died in the Park. We used part of the milk for chocolate, and set part by for cream for the next morning. The milk had a rank sourish smell, and taste like rank butter, the cream next morning was more so. We boiled the milk, which did not curdle, so we used the cream with tea, though the taste was not very agreeable. The milk boiled curdled in the tea; neither any of my family, nor a friend who drank of it, found any inconvenience from it. Upon sending the morning following for more milk, the people refused selling any, saying one cow was taken ill, and another was near dry. This was the cow whose milk we had had, and she died in forty-eight hours. Next day another fell ill, and was knocked on the head by the public officer, in about forty-eight hours after her being seized. I had the curiosity to see this cow opened, which was done the next day but one. The inflammation in general in this creature was greater than what I had before seen in any of those which died of the distemper. This cow had been blooded about three weeks before she was taken, and once as soon as taken. The caul (*omentum*) was greatly inflamed, the paunch inflamed, and the inner coat peeled off, especially that of the abomasum; the guts were all inflamed, the liver was much inflamed in some parts, in others was turned livid; the gall-bladder was very large, and the gall was very liquid; the lungs adhered in many places to the pleura, were greatly inflamed and turgid with blood, and were in many places quite black. I did not find any of the watery bladders on the surface of these, as I did on all the others I had seen opened. Here's an instance of the most surprisingly quick progress of this distemper, and to such a violent degree, that I don't think it in the power of medicines to have prevented death; but I think this case is still a further confirmation of the necessity of plentiful bleeding as soon as a beast falls sick, especially if a shortness of breath ensues. This cow was not come to the stage of purging.

'From the distemper getting into the Park, I think there is reason to conclude it cannot arise solely from any fault in the food, because the pasture is always good there, and, from the great number of horses, always kept low, and the soil never dunged or manured, and the cows have plenty of hay in winter. How it got into the Park is very strange, there having been no fresh cows brought in there since Welsh fair in August. And this is further very observable, that though this distemper seems so very infectious among the cow kind, yet I do not hear any of the deer have fallen ill, which is much more likely to happen to them than to the horses, because they chew the cud, these do not. I humbly therefore suggest whether it would not be the most likely means to put a stop to the spreading of the distemper, to forbid any cows or calves being brought to market, to be sold alive, or that any farmers should buy in any fresh cattle for six months, or till it is found that the distemper is entirely ceased; and that all fat cattle should be kept carefully separated from the cows and calves, and that under severe penalties.' An Appendix to the foregoing paper. 'Upon my reading the foregoing paper, some gentlemen present favoured the company with the following informations and remarks. Mr Theobalds, a worthy Member of the Society, and a diligent observer of remarkable occurrences, informed the gentlemen present, that the first infection of this dreadful distemper among the cow-kind was brought over from Holland, in April, 1745, by means of two white calves, which a farmer at Poplar, near London, sent for in order to mix the breed; and that the infection was got to Maidenhead, in Berkshire, by two cows brought out of Essex, and sold at the fair there; that there was observable a very disagreeable smell in the clothes of persons who had been very conversant with sick cows, and that the infection had been propagated by means of sheep, who, it is presumed, carried it in their wool. Upon the mention of this scent in clothes, I remarked that Dr Lobb, in his late book entitled Letters relating to the Plague and other Contagious Distempers, recommends to persons conversant about sick cows to wear a linen garment (over their clothes) wetted with a mixture of salt and vinegar, and he gives many prudent useful rules to farmers for the management

of their sick cattle. Dr Parsons, another ingenious Fellow of the Society, said, that the cattle in the high grounds about Hampstead, Highgate, Millhill, and Hembdon had hitherto remained free from the infection, but that it had spread all about in the lower grounds.[1]

'Mr Hoffman, a learned Danish gentleman present at this meeting, said this infection was first carried into Denmark by raw hides of cattle dead of this distemper, rubbed with wood ashes, in order to preserve them fit for tanning, which were brought from Flanders; that some cows sickened in a few days after the unpacking of these hides in Denmark; and that they have lost upwards of 50,000 head of cattle in that kingdom. At another meeting, Mr Collinson, a member greatly deserving of the Society, acquainted the company present that a farmer in Essex, who had the distemper among his cows, invited a neighbouring farmer to come and assist him in giving drenches to some of his sick cattle; the good-natured man went accordingly, and spent best part of the day with his neighbour, to lend him his help in his distress, little dreaming of what ill consequence this friendly act was about to prove to himself; for being so many hours conversant with the diseased cows, so much of the infectious effluvia adhered to his clothes, that, as he was walking home, which was about a mile and a half, his way lying through a field in which several of his own cows were feeding, he no sooner entered the field, but the cattle all left off their grazing, ran to the farther end of the field snorting and flinging up their noses, showing the greatest uneasiness at their master's approach, and endeavouring, as much as possibly they could, to avoid him, as though they smelt something very disagreeable; and so indeed it proved to them, for the very next day many of them fell sick, and died in a few days.'[2]

[1] At a later period of this outbreak, it was observed that Wiltshire and a few other places remarkable for a light, porous, and dry soil, with an elevated and open aspect, escaped the disease altogether, or were but lightly visited.

[2] Philosophical Transactions, vol. xliv. A book entitled 'An Account of the Present Epidemical Distemper amongst the Black Cattle, &c., by a Member of the College of Physicians, published in London in 1745, may be mentioned here for the purpose of reference. It is full of grave errors and imperfect or erroneous observations, especially as regards the pathological anatomy of the disease in ques-

Dr Lobb, the gentleman to whom Dr Mortimer refers, and who appears to have been an early observer, writes: 'The contagious distemper, which has for some time been among the larger cattle in foreign countries, and which, as I have been informed, appears now among that sort of cattle in Essex, in Scotland, and in Ireland, is a subject not unworthy the consideration of physicians. . . . The owner of cattle in a contagious season should have a faithful servant continually in the day-time with his herd (as the farmers in Wiltshire, and other countries, have shepherds with their flocks of sheep) to watch, and observe when any of them begin to grow sick, which the herdsman may discover by the beast's falling off from its usual feeding, and a dullness of its eyes. As soon as the least symptom of illness appears in any beast, separate it from the herd, and convey it into some place of confinement, either into a booth of boards erected for this service or into some inclosure. The observance of these rules is of great importance, because little or no infection is emitted from the body of the beast immediately in the beginning of his sickness; but, as the distemper proceeds, more parts of the blood are transmuted into the quality of those which produced it, and more infectious particles will be emitted from the body of the sick beast, and the danger of other cattle near the sick will daily very much increase. . . . Let the booth be erected, if it can be, at least a quarter of a mile from the cattle, and from houses inhabited. This I propose as a means of safety to men and to beasts. . . . Let the persons employed about the sick beasts keep as much as possible to the windward side of them, and carefully avoid taking their breath; and while drenching, or otherwise handling the beast, keep their hands wetted with a mixture of salt and vinegar, and let each of them wear a linen garment, after it has been wetted with vinegar, and dried, over all their clothes (like that which is used by some country carters for keeping off the dashings of dirt) to be buttoned close under their

tion. Like some physicians of our own day, he believed in its spontaneous origin: 'the distemper has sprung up spontaneously, about the same period of time, in many places which are very distant from and have no communication with each other.' One cannot be surprised at the disease ravaging the country for so many years, when such opinions were allowed to prevail at its commencement.

chins and at their wrists, while they are among the sick cattle, and put it off before they go to any other business. . . . If the sick beast dies, let it be immediately buried with its hide on, and with or without quicklime, in a pit seven or eight feet deep, and the earth filled in close upon it, that no exhalations may pass from the dead body through the earth into the air of the atmosphere. . . . POSTSCRIPT.—It is a pleasure to tell you, that since I wrote this letter, I have been informed that the mortality among the cattle in Ireland was not propagated by any contagion, but was occasioned by the scarcity and badness of their food the last winter, which therefore we may hope will soon cease, as their food is now plentiful and wholesome.[1] . . . It appears to be very prudent, in regard to the present sicknesses among the cattle in Essex, Scotland, and Ireland, to have researches made (according to the method proposed) in order to find out the nature or quality of the causes that produce them, and the proper remedies. But besides the accounts mentioned, there should be transmitted with them a particular account of the

[1] I am unable to find any particular allusion to the probable introduction of the Cattle Plague into Ireland at this time; and indeed the existence of the malady in that island appears to have been altogether overlooked by recent investigators. Besides the notice given by Rutty for 1745, in *Faulkner's Journal* for August 26th, 1746, mention is further made of this epizoöty in Ireland. 'A great number of cows have lately been affected with a dry, husky cough and universal tremour, and the urine which they make is generally very pale; the colour of their eyes is not altered, neither is the breath so offensive, nor their tongue so black, as last year; some have a violent purging, others very costive, and it has destroyed a vast quantity of cattle.' In the same Journal for 1747, the existence is noticed of 'an epizoöty in England among horned cattle; their removal from one town to another prevented.' Another account I have been able to procure refers to some murrain, which may have been the one under consideration, and is to be found in Dutton's Survey of the County of Clare. He says: 'The murrain was a very common and fatal disorder some years since. Like the rot in sheep, it exercised the ingenuity of conjecture and quackery. It was by some imputed to a worm with a very large head, and of very vivid colours, which, it was said, poisoned the water that the cattle drank. By others it was conjectured that some poisonous plant, the seed of which, it was supposed, dropped from the clouds at that particular period, and which most fortunately asses were fond of. On account of this happy propensity they were purchased by many sagacious graziers, and, the murrain ceasing about this period, the asses had all the honour; and it is still usual to keep two or three of these animals on a farm. The number of cattle killed by this dreadful disease was inmense—many persons lost almost the entire of their stock, and were completely beggared. However the cure of it may have been effected, it has not been known for several years.' P. 79.

cases of the cattle in the sickly countries, as to the quantity and qualities of their food.'[1]

There is in the London Gazette of Saturday, May 25th, 1745, the following paragraph, viz.:

'Hamburg, May 19th, N.S. The mortality among the horned cattle has now reached within a German mile and a half of the Balliage of Pinnenberg, contiguous to the territory of Hamburg, which is of little extent on the side of Danish Holstein. The appearance of this same distemper at Hamburg, gives an alarm lest it should gain further on that side of the country, proper precautions are used to prevent its spreading, and to get the better of it in its beginning, which is attributed to some infected cattle having passed through there. This evil has communicated itself likewise to the Danish Islands of Zeeland and Fuhnen.'

Dr Layard[2] gives us a very detailed description of the disease, but drawn chiefly from other authors. His work did not appear until twelve years after the outbreak of the pest. Its substance will be presently given in the words of Mr Dossie.

Two years before Layard's Essay was published, Malcolm Flemming recommended inoculation as a preventative of the Cattle Plague. His recommendations are contained in a pamphlet entitled, 'A Proposal, in order to Diminish the Progress of the Distemper among the Horned Cattle, supported by Facts.' London, 1755. *See also* The Gentleman's Magazine, vols. xxiv. and xxv. for 1754 and 1755. The earlier volumes also contain many notices on the progress of the Cattle Plague.

With reference to inoculation, for November, 1754, it says: 'Mr Dobson, a gentleman of Yorkshire, lately communicated to Mr Tyson, a farmer and higgler of Tottenham, in Middlesex, a method of preserving his cattle by inoculation. This method Mr Dobson had learned from an eminent physician in Yorkshire. The operation was performed by an incision in the dewlap, into which was inserted a piece of tow dipped in the morbid matter

[1] *Dr Theophilus Lobb.* Letters relating to the Plague and Contagious Distempers, 1745.

[2] *Dr Layard.* An Essay on the Nature, Cause, and Cure of the Contagious Distemper among the Horned Cattle in these Kingdoms. London, 1757.

discharged from the nostrils or eyes of an infected beast, and this was allowed to remain till the symptoms of the distemper appeared.' Dr Layard, writing on the 26th of November, 1757, to the Earl of Macclesfield, endeavours to remove all apprehensions of a second attack of the disease after inoculation. 'An entire conviction of the analogy between this disease and small-pox would not permit me to omit mentioning the great advantages which must arise from inoculation. . . . So long as the distemper has raged in Great Britain not one attested proof has been brought of any head having this disease regularly more than once. . . . . The Marquis (de Courtivron) says that this distemper is not communicated but from one beast to another immediately. I must beg leave to say, that, to my knowledge, the distemper in February, 1756, was carried from the farm-yard, where I visited some distempered cattle, to two other farm-yards, each at a considerable distance, without any communication of the cattle with each other, and merely by the means of servants going to and fro, or of dogs.'[1]

The disease, as we have seen, raged in all its virulency in this country for many years.[2] We have no difficulty in discovering the cause for this. Veterinary science scarcely found the shadow of a representative in the ignorant cowleech, and there were none but medical men at all competent to give any advice as to the best measures to be adopted to meet the emergency. These men, able and skilful undoubtedly in their own profession, had, in all probability, nine-tenths of them, never before given comparative pathology an hour's study; and the knowledge of the diseases of mankind only, without this study, would be far more likely to mislead than to guide them, and to make them oppose, rather than approve of or suggest, the proper preventive measures. There appears to have been no Lancisi—no Dr Bates, to point out the incurable character of the disease, and to suggest that as it spread by contagion alone, so it could only be suppressed by destroying the contagious source. It is even

[1] Philosophical Transactions, vol. i. p. 528.

[2] Bishop Berkeley, writing to the London Magazine in 1747, says, 'If I can but introduce the general use of tar-water for this murrain, which is in truth a fever, I flatter myself this may pave the way for its general use in all fevers whatever.'

questionable if the true nature of the epizoöty was discovered for a long time after its introduction. A *cure* by medicine was sought for, and with the usual result. In this way, *nearly a year was spent in nursing the virus, and in disseminating it over the two or three kingdoms,* until at last the public mind began to be roused to a sense of the danger that threatened the herds, and legislative measures were brought to bear against the desolating scourge. But it was too late, by many months, for these to be made at all effective. 'A commission for Middlesex was appointed on the 25th of November, 1745. The Commission, with the short experience of 1715 to guide them, appointed various cowkeepers and butchers as inspectors of cattle, and instructed them—1. To inspect cow-houses, and to separate sick from sound cows. 2. To see that all cow-houses and yards were kept thoroughly clean. 3. To kill all sick cows and calves, to slash their hides so as to render them useless, with several cuts from head to tail and round the body, and then to bury them in graves ten feet deep, with two bushels of unslacked lime to each cow. 4. To certify to the destruction of the cows, for each of which the Treasury gave 40*s.* 5. To see that proper returns were made by cow-keepers as to their losses.

The disease having spread beyond Middlesex, an Act was passed and received the Royal Assent on the 13th February, 1746, empowering the Crown to issue, through the Privy Council, rules and directions in order to prevent the distemper spreading amongst horned cattle.

On the 12th March, 1746, an Order in Council was passed in which the incurable nature of the malady is set forth and the following regulations appear:—1. Cow-keepers must shoot infected beasts, and bury them entire with slashed hides, four feet deep covered with lime. (The direction as to the use of lime was subsequently revoked.) 2. All hay and litter used by diseased animals must be burned. No herdsman who has attended a diseased beast is to go near a sound one without changing his clothes. 3. Infected sheds must be thoroughly washed all over, then disinfected with burning sulphur, &c., again repeatedly washed with vinegar and water, and not used for two months. 4. Convalescent animals are not to be mixed with sound ones for one month,

and not then till they have been well curried and cleansed with vinegar and water. 5. Flesh and entrails of diseased cattle are not to be given as food to other animals. 6. No man whose herd is infected is to be allowed to drive any cattle, whether diseased or not, beyond the boundary of his farm. And even when disease has disappeared, his herd is to be held infected for a month. 7. Local authorities, such as churchwardens, overseers, constables, or cattle-inspectors who may be appointed, are charged to see to the execution of this order. They are to report to each meeting of Justices, and to make exact returns. 8. These local authorities are to persuade owners to divide up their herds into separate parts; they are not only to see to the burying of diseased cattle, but also the burial of all infected dung. 9. Cattle travelling on roads are to be stopped and examined. 10. Houses, buildings, or yards used for cattle, sound or diseased, are to be carefully kept clean. 11. Compensation for slaughtered cattle is to be paid at the rate of 40*s.* per head; for calves 10*s.*

Towards the end of that year, the Government found that the local authorities had not assisted them vigorously in the execution of the first Order, and they issued a second to the effect, that from the 27th December, for three calendar months, no person shall send to fairs or markets any cattle except for immediate slaughter, or 'buy, sell, or expose to sale any cattle except those which are ready for immediate slaughter. Nor is this privilege of selling fat cattle permitted to any one whose herd is infected. Therefore all beasts going to fairs or markets must be provided with passes from a Justice, or, failing him, from other competent local authorities, given on the owner's oath that his cattle are and have been for a month free from the plague. No raw hides shall be sold or allowed to be transported without like passes, but hides and horns of diseased beasts must absolutely be destroyed, and a compensation of 10*s.* per hide is given.'

A third Order in Council was issued, proscribing the district from the Humber and Trent, and not allowing cattle to be driven out of it northwards from the 19th December, 1747, to the following 27th March.

On the 13th February, 1747, an Act to amend and extend the

powers of the previous Act was passed; and this was followed, up to 1757, by various continuing and enlarging statutes. In addition to the measures before specified, these Statutes also provided that sales of cattle should only take place when the seller had had them in his possession for 40 days; calves were not allowed to be sold, in order that they might be preserved for breeding purposes, and severe restrictions were put on the sale of the hides of diseased animals.

Various Orders were issued during the year 1747, stopping local fairs, and empowering local authorities to do so when they found it expedient.

The plague, in consequence of these Orders, was extinguished where the local authorities acted with vigour, but lingered in other places when these were remiss or indifferent, which was generally the case; so that it spread after a time as rapidly as ever. In consequence of this, in 1749, there is a new suspension of all fairs and markets, and of all movements of cattle, except for slaughter, throughout the kingdom for three months. This was modified afterwards, sound lean cattle being allowed to be changed to clean pastures, and cows being allowed to go to bulls when both were sound. The same result followed this new Order as its predecessors. The disease was extinguished in many counties, but lurked in others where the local authorities had been lax in looking after the execution of the Order. Hence in December, 1749, the Council admits its failure in suppressing the disease, and now again prohibits all movement of cattle except for slaughter, and the place of slaughter must be within two miles of the spot where the cattle are on the 14th December, 1750. The requirement that cattle should be slaughtered only within two miles of their stalls was found very grievous by London and Westminster, and the outcry raised against it by these influential places produced a revocation of it within a month of its issue. . . For some time after the revocation of the Order of 1749, each county proscribed neighbouring infected counties, and refused to receive their cattle.[1] The roads from one county to another were

[1] The following is from a private memorandum on this disease, which was published in 1866.

'1754.—In the Session of 1753-4 the question of the Cattle Plague seems to

strictly guarded, and cattle, hides, carcases, and tallow from any infected counties were carefully excluded.

have received much attention in the House of Commons. Papers upon the subject, and a return of the sums paid for compensation, were presented, and referred to a select committee, who reported certain causes of spreading the distemper, and made recommendations, having come to 16 resolutions on the subject.

'These are given *in extenso*, as showing the opinion of the House of Commons after eight years of the distemper.

'1. The lodging of cattle driven for sale in places where infected cattle are or have lately been, may be one cause of spreading the distemper.

'2. The mixing together different herds of cattle not fit for immediate slaughter in fairs, markets, and other places for sale has been one other cause.

'3. The mixing of infected cattle with sound on commons and common grounds has been one other cause.

'4. Great difficulties and inconveniences have arisen and may hereafter arise from the want of proper powers to order the lodging cattle stopped by virtue of his Majesty's Orders in Council of March 22, 1747-8.

'5. The laws, rules, orders, and regulations for the killing of infected cattle upon their first being seized have not in general been punctually complied with.

'6. Certificates for cattle to be driven beyond the distance of five miles, without a limitation of time beyond which such certificates shall cease to be of force, are subject to abuse, and may have been one other cause.

'7. All contracts and bargains between the buyers and sellers of cattle, conditional upon such cattle, or any number of them, surviving a certain time, tend to the continuing and further spreading of the distemper.

'8. The laws, rules, orders, and regulations now in being should be reduced into one Act of Parliament, subject to such alterations and regulations as his Majesty, by the advice of his Privy Council, shall from time to time think proper to order.

'9. The notices ordered to be given of the breaking out and arising in particular places of the distemper by his Majesty's Order in Council of the 22nd day of March, 1747-8, should be published in the *London Gazette*.

'10. No horned cattle should be driven or admitted into any pasture, close, or field where the distemper has been for two calendar months after such distemper has ceased, nor for six calendar months where such pastures, closes, or fields have not been cleared of all litter, dung, stones, or hay, and where such pastures, &c., have not been rolled, mowed, or fed bare with horses, hogs, geese, or sheep.

'11. No certificates for cattle to be driven beyond the distance of five miles, conformable to his Majesty's Order in Council, should be of force for any longer term than ten days from the date of such certificate.

'12. No two or more herds of cattle, consisting together of above 20 beasts, intended for immediate sale, and not fit for immediate slaughter, should be driven or admitted at the same time in the same pasture, close, field, fair, market-place, or other place of sale whatsoever, unless such pasture, &c., be so separated and divided as to preserve the cattle of such different herds from immediate contact.

'13. No horned cattle should be driven to pasture in common or common grounds unless such cattle have been in the possession of their owners and free from the distemper 40 days at the least before such driving.

'14. Proper powers should be granted for the lodging [disposition] such cattle

These measures, however, had but a very partial effect. For the next two or three years this local war against the disease was allowed to be waged, the Government occasionally interfering when the magistrates permitted fairs in places likely to be injurious to neighbouring counties. It continued up to 1756 with considerable variations, the Plague being intense in some counties, milder in others, and absent from many, until it wore itself out. There is no accurate record within our knowledge of the mortality produced by it. In the second year of the visitation, 100,000 head of cattle are supposed to have been lost in Lincolnshire; in the third year, more than 40,000 died in Leicestershire and Nottinghamshire, and in about six months of that year, 30,000 perished in Cheshire. In the same year, 80,000 were killed, under the Orders in Council, to prevent the spread of the contagion; and in the following year, they were destroyed at the rate of 7000 a month; but a far larger number perished by the disease. During its course it must have destroyed several hundred thousand cattle.[1]

as shall be stopped by virtue of his Majesty's Order in Council, dated March 22, 1747-8.

'15. All contracts and bargains between the buyers and sellers of cattle, conditional upon such cattle, or any number of them, surviving a certain time, should be void, and further penalties be inflicted upon all those who shall so offend.

'16. Reward equal to the full value should be paid to the owner of every first, second, and third beast of the whole stock of horned cattle upon every farm or holding [or upon commons thereto belonging] of the same person, that shall be seized with the distemper, and that shall be separated, killed, and buried conformable to his Majesty's Order in Council of March 22, 1747-8, provided such beast or beasts shall have been the real property and remained in the actual possession of such owner 40 days at the least immediately preceding such killing.

'These resolutions were agreed to by the House, with amendments, shown in brackets, in the 14th and 16th, and a Bill was founded upon them, which passed through the House of Commons, but was rejected on going into committee by the House of Lords, perhaps in consequence of the approaching dissolution of Parliament, and a simple Continuance Bill was passed instead.'

[1] First Report of the Royal Commissioners on the Cattle Plague, p. viii. The remembrance of this fearful epizoöty among the cattle in Britain has not yet passed away. Mr Ceely, for example, in speaking of the epizoöties and enzoöties of the Vale of Aylesbury, says: 'In common with many other parts of the kingdom, this neighbourhood suffered much from the contagious epizoöty which prevailed so fatally among horned cattle from the years 1745 to 1780. The places of interment of many of its victims are yet pointed out, and the dismal tales of its ravages are remembered by many with whom I have conversed.'—*Observations on the Variolæ Vaccinæ.* Trans. Provincial Med. and Surg. Assoc.

In a work entitled 'Considerations concerning the Distemper which still spreads itself among the Horned Cattle in this Kingdom,' by a Physician, and published in 1749, we are made acquainted with some of the causes which led to the extension and retention of the disease in England; and learn something of its contagious character, and its symptoms, as well as a method of *cure*. From this treatise we will make some extracts. Speaking of the doctrine of contagion, a subject which was then much debated, and which was for more than a century later to furnish a bone of contention to medical men, and to lead to oftentimes unhappy results by permitting infectious and contagious maladies to run riot amongst mankind, because certain physicians did not believe in the communicability of special diseases, he says: 'At present it is my design to consider this doctrine principally as it concerns pestilential contagion, and that chiefly in relation to the calamitous distemper which has so long raged among the horned cattle in this island, which I take to be pestilential. Nothing in my humble opinion did so much contribute to the spreading of this terrible distemper at its first breaking out *as the belief that it was not contagious, and the expectation of an effectual remedy for it;* because both those notions had a manifest tendency to lessen the care and vigilance that were necessary to prevent it. In regard to the latter of them, I am not ashamed to own I was then an infidel; and I am so still as to the possibility of the cure before the malignity of the distemper began to decline; being fully persuaded that what Virgil says on a like occasion is too applicable to the present as well as every other pestilence in its beginning and at its height, viz. that it admits of very little relief from the Art of Medicine. Such of the most eminent physicians as were first consulted by the Government concerning this distemper were certainly of the same opinion as to the difficulty of curing it, and therefore very honestly advised their superiors to employ their authority in enforcing a punctual compliance with the most likely means to stop the progress of it—an attempt which there was then some reason to believe as practicable as it was desirable. . . . . It has been suggested by an ingenious writer, who some time ago undertook to confute the opinion of

this distemper's contagion (see *An Account of the Present Mortality among the Black Cattle*, 1745), that the notion of contagion may contribute much to the mortality of the distemper "by putting the dealers in cattle upon an improper method of treating it." This may possibly be true, but it is no argument against the reality of the distemper's contagion. The same improper method has often been deduced from the same principle in the small-pox, and yet nobody will scruple to own that distemper to be contagious. . . . I cannot therefore but wish that, instead of patronizing the contrary opinion, this ingenious author had endeavoured to confirm the farmers in their notion of the distemper's contagion, and to convince them of the falsity of the inference in respect of its cure which they had been taught to draw from it. In this case he would have contributed more to the stopping of it by his *theory*, than either he or any eminent physician upon earth could probably have done during its first violence by any method of practice. . . . . It is very observable that this pestilence among our cattle very much resembles that of Ramazzini in most of its symptoms and effects, as in the stupidity of the beginning, the flux from the nose, the looseness, the shortness of breath, the coagulation of the blood, the crisis which sometimes happens by eruptions (Ramazzini tells us these pustules, which he calls *Tubercula variolarum speciem referentia*, broke out over the whole body on the 5th or 6th day, and that the cattle generally died—as they do now—about the 5th or 7th; from whence it is probable these eruptions were not symptomatical but critical, as they are in the present distemper, wherein scarce any beast that has them dies. It appears, then, that the learned author of the *Account*, &c., was mistaken in what he tells us, "that this *variolous* eruption was the distinguishing mark of the disease described by Ramazzini, and that either he was misinformed when he said no such eruptions are seen upon the skins of cattle, which are now infected, or that this symptom is one instance of the present mitigation of the distemper's original virulence"), and the dry hard substance constantly found in the *Omasus* or *Paunch*, which Ramazzini supposes, but in my opinion unjustly, to be caused by the first impression of the contagious miasmata on that part. For it appears to me as if it

proceeded merely from the violence of the fever, which causes an entire defect of the juice that is naturally secreted there for the moistening and lubricating the food and the paunch; for want of which juice I can easily conceive the dry food to be capable of being baked by the preternatural heat of the body. . . . . The excessive mortality of the present distemper under every method of cure in its beginning is sufficient to prove its malignity, if anything can; and from the degree of its malignity, I think we may safely infer the species of it. For as pestilential malignity is the most mortal of all others, and no malignity was scarce ever more mortal than this among the cattle, it is surely good logic to infer that the malignity of the present distemper is no other than pestilential. . . . . I am of opinion, that as the pathognomonic sign of the distemper described by Severinus was a sore-throat, so the distinguishing one of this among the cattlè is a peripneumony, or inflammation of the lungs. Neither is this sign of a peripneumony less familiar to a plague than any other topical inflammation is . . . I will not pretend to say there are no aphthæ in this general inflammation, they being very common in many inflammatory disorders, where they are not the pathognomonic; but that the general and most obvious symptoms of this distemper are such as belong to a peripneumony, will not be controverted by any physician who has either seen it or heard any description of it. . . . . I will only add one thing more concerning the learned author's determination, which is, that with submission to him I think a *pestilential peripneumony* is a more discriminating name for this disease than a *gangrenous contagious* one; for the most striking circumstance in this calamity, the prodigious mortality of it, is not so thoroughly implied in the author's two epithets, as it is in the one I have given it, which likewise expresses every circumstance implied in *both* those of the learned author. . . . It cannot, I imagine, be denied that to give contagion a power of infecting an animal, there must be a disposition in the animal itself to be acted upon, as well as in the contagion to act upon it. For if the simple power of contagion was able to infect, it would not be possible for any animal that lived within its reach to escape its influence; but it is a known truth that some escape it who live in the midst

of it, in all, even the most virulent of contagious distempers. In what this disposition in an animal to be acted upon immediately consists, we are not enough in the secrets of nature to explain, any more than we can tell what constitutes the specific essence of any contagion. . . . . I never denied it to be possible in the height of some very violent plagues (when a great quantity of pestilential vapours are continually exhaling from innumerable bodies—both living and dead), for some of the contagious effluvia to be carried from the places of their emission, by a current of wind constantly running in the same direction, to a considerable distance; by which means I can easily conceive it possible for some people, who have no commerce with the infected, to live within the limits of the progress of these contagious effluvia, and consequently within the influence of their power. But supposing these facts could not be thus accounted for, I would beg leave to ask, whether these authors do not seem to have been too hasty in affirming there was no communication between these people living at a distance and the infected places? For what they affirm is a negative which cannot be proved, and therefore ought not to be admitted. If by no communication they mean only no communication of the same species of animals, that will not answer their purpose; because contagion may undeniably be communicated by many other ways, many of which might be practised without falling under the observation of the persons who received the infection. All other species of animals may carry it without being infected by it themselves, and as nothing is known to retain infection more than hair, it may, and doubtless has been carried by animals who have strayed from the infected to the sound. . . . . Neither does diet any better account for this excessive mortality. For these exclusively mortal distempers equally destroy all creatures of the same species, however differently dieted. We cannot, therefore, but subscribe to the general opinion concerning the principal cause of such excessive mortality, and acquiesce in their judgment, who have imputed this effect to pestilential contagion. It only remains, then, to inquire whether the confessed mortality of the present distemper has not always been excessive in every condition of air and diet, for a long time after its first breaking out? And as a proof that it

has been so, I need only appeal to those who have observed its mortality in very different countries and very different seasons. The truth of this fact would have been still more apparent but for the early care of the legislature, which by enabling distant countries to guard against the approach of suspected cattle, did thereby for a long time prevent the infection from being carried into many different grounds of very different degrees of fertility. But, notwithstanding all their prudence, it has now insinuated itself into very distant countries and very different soils, where its pestilential contagion is even still sufficiently evident. . . . . A late ingenious writer (vide *Essay on Pestilential Contagion*) has proposed the only effectual method, if indeed anything can be effectual in the present diffusiveness of the contagion, which I think there is too much reason to doubt. For if we consider how long it has now raged among us, and how ineffectual every method enjoined by the legislature to restrain the communication between the infected and the sound has for a long time been, we cannot but think it probable that some portions of infection are now dispersed in an infinite number of places in this kingdom, and as long as any of these infectious portions remain undestroyed (which in some that are lodged in substances very retentive of infection, such as hair, wool, &c., must certainly be a long time), so long it will be in the power of every animal in whose clothes or hair they at present lie concealed to propagate them whenever they come near that species of animals which alone they are adapted to infect. And when the occasions of spreading disease are become thus extensive, what can a Government do? Be it ever so disposed to restrain any suspicious commerce between its subjects, it cannot prevent danger where it sees it not; and be it ever so circumspect and vigilant, it cannot possibly see where it is, unless it offers some marks of itself to men's senses; which it certainly does not but where it meets with its object, the cattle themselves. Wherever, indeed, it actually breaks out, from thence all further occasion of spreading it may be prevented by the learned author's method; but still it may be propagated from every other place and thing where it continues unexhausted; and therefore it must necessarily be a long time before it be extinguished. (Perhaps it

would not a little contribute to the accomplishment of this difficult purpose to lower the hedges and cut up all the superfluous wood in enclosures of a dry soil, by which means not only a freer communication of air would be obtained, but likewise a greater degree of dryness and purity; and in marshy and fenny inclosures, where infected cattle are known to have been, it seems no less useful to burn wood for some time after they have left them.) As to the method which was at first employed to stop the progress of the infection in any place where it had once broke out, viz. the indiscriminate shooting of the sick cattle, though it was at first wisely enjoined by the legislature, yet I am of opinion, that unless it be always executed upon the very first suspicion of the distemper's appearance, it never was, nor ever could be, effectual. And if nothing can justify the killing a few but the probability arising from thence of saving the rest, what is killing them without such probability but conspiring with the distemper against the lives of the whole? But there can be no such probability without a punctual observance of the circumstance above-mentioned, viz. a very early execution of the Government's Order; and what chance there is for such a compliance in a country where we are apt to prize our liberty most when it is least useful to us, our fatal experience has already too well informed us. Nor in the present extensiveness of the contagion can even the most early execution of this Order be always successful; for though it be probable from some experiments lately made that the cattle do not infect each other till a few days after the very first signs of the distemper in themselves, yet it is no less probable from other experiments, as well as the reason of things, that the pastures in which they feed, nay, the very highways through which they pass, do receive and retain some portions of contagion accidentally brought into them by animals of different species; so that though they escape it ever so often from each other, by the care of their owners, yet they are every hour liable to it from many other accidents. When the means, therefore, of communicating the distemper are become thus numerous, and the chance for preventing its spreading from that as well as other causes is proportionately lessened, surely it is advisable to apply our industry to find out the means of cure.

And this, if I am not much deceived, the present mitigation of the distemper's original severity has made much more feasible than it was some time ago. (As great havoc as the distemper makes at present, it is very certain that many more cattle have for this last year and a half recovered than did from its first breaking out to that time. And this is true both of those treated medically, and of those which are not. This difference of event in regard to the latter, cannot be denied to proceed from a different degree of violence in the distemper; and I think the same conclusion may be justly drawn in respect of the former, since no method of treatment for some time after its first appearance —when all kinds were tried—was able to produce the same event.) The cure consisted in bleedings every day for three, four, or five days, with drenches of water gruel, and afterwards warm mashes of bran and water gruel alternately until nearly quite well, when dry food was to be allowed in very small quantity. The animal was to be kept in a warm house with plenty of straw to lie on. . . . . If the beast breaks out in *blotches* about the fifth or seventh day, its recovery may be depended on; but a great many do also recover which have no such *critical* eruptions. . . . There may undoubtedly be some occasions where it may be useful, and even necessary, to add some medicines; and whoever has a mind to use them properly may find them very judiciously adapted to the chief indications of cure in a late pamphlet styled *An Essay to fix the Judgment of the Public on the Nature and Cure of the Distemper now raging among the Horned Cattle, &c.*, which, so far as concerns the means of cure, is the best which has yet been published on the subject.'

Another physician, writing in 1751, remarks: ''Tis observed in experience, that sometimes the particular distemperature of the air infects human bodies only. Again, it shall only infect animals, sometimes of one kind, and sometimes of another; and of late we have had a very fatal experience of a most raging pestilential fever among our horned cattle, from a peculiar pollution in the air. And what confusion of advice and melancholy destruction have we been witnesses of in the present raging sickness among the cattle, except in some few instances where the rational means of cure have prevailed. . . . . For when the

distemper is suffered to get a-head, there is little hopes of a recovery; this sickness among the cattle being evidently a most inflammatory and pestilential fever, admitting of no delay; for if once the inflammation be suffered to form, or fix on the lungs and other viscera or bowels, very little hope is then left.'[1]

On the 30th of August, 1748, it was announced that the justices of the peace in several counties where the distemper had raged among the horned cattle, had certified to the Privy Council that the infection had ceased. In the month of September of the same year, however, it was declared that the distemper among the horned cattle had broken out afresh about Burton-upon-Trent, in Buckinghamshire, and also near Camberwell, in Surrey. In the month of September, 1749, a report from Manchester was published, to the effect that the plague had reached Lancashire, and that it continued to rage in the counties of York and Durham. The distemper raged in the month of November, 1750, in the Isle of Ely and some parts of Suffolk. In the month of May, 1751, it was reported that, in consequence of 'the infection among the horned cattle raging in Yorkshire, Lancashire, and Westmoreland, the justices of the peace of the neighbouring county of Cumberland have, at their quarter sessions, ordered the roads to be strictly guarded for preventing the introduction of cattle, hides, carcases, or tallow, from any adjacent English county. The said distemper is broke out also in the counties of Wilts and Oxford, which has alarmed the justices of the counties of Gloucester, Hereford, and Monmouth; and the justices of Somersetshire have forbid the bringing of cattle from Wales, Wiltshire, and Gloucestershire, on advice that the distemper is spread into those parts.' On the 26th of February, 1752, it was stated that the justices, at their respective sessions, had announced that the distemper was raging in the parishes of Ash Church and Beckford, in Gloucestershire; in several parts of Buckinghamshire, and the adjacent counties; within the division of Holland, and in several other parts of Lincolnshire; and in the counties of York, Lancaster, and Derby. In the month of March, it was declared that the disease seemed to be much abated. In

[1] A Treatise on the Plague and Pestilential Fevers, with some Observations on the Pestilential Fever now raging among the Horned Cattle. London, 1751.

Wiltshire it had totally ceased; but in Somersetshire sixteen had died in the parishes of East Chennock and Clodsworth.[1] On the 9th of May it was said: 'Tis hoped the distemper among the cattle at East Chennock is stopt, not one having been taken ill for above three weeks. Great care has been taken by the justices to prevent the calamity from spreading. All fairs have been stopt for some time, and above twenty shot by order of the clerk of the peace. The cattle were appraised, and the owners paid out of the county stock; and one of the oxen in an ox-waggon which carried the soldiers' baggage, falling down dead, the other five were immediately shot.' On the 31st of May, it was announced that the distemper was about six miles east of Reading, Berks, where it had not been before.

Early in 1753, 'The distemper among the cattle being broke out near Malmsbury, in Wiltshire, fifteen belonging to one man were ordered to be shot; and the justices of the peace this day prohibited the holding any fair or market, and removal or sale of any, except fat cattle for immediate slaughter.' On the 15th of October, 1753, a farmer of the parish of Shemping, in Suffolk, was convicted, on his own confession, before two justices of the peace, in the penalty of £100, for buying and driving infected cattle, contrary to law, and immediately paid the penalty; and his servant was afterwards committed to Bury gaol, not being able to pay the penalty of £50 for intimidating and preventing the inspector and parish officers from executing his Majesty's orders and regulations, and not suffering them to kill four beasts that were distempered, whereby the infection was spread into several adjoining parishes. On the 26th of October, 1753, the clerk of the peace for Ipswich received notice of upwards of sixty parishes within the county where the distemper had broken out amongst the cattle. On the 3rd of November, 1753, it was reported that the distemper among the horned cattle had broken out at Chatham, and ninety-seven had died on the roads between that place and Canterbury. The

[1] The *Dublin Gazette* for March, 1752, speaking of the Cattle Plague in London, says: 'The distemper among horned cattle rages considerably about the skirts, insomuch that last Saturday several cows were buried in the fields at the bottom of Gray's Inn Lane.'

infection was supposed to have been communicated by some droves lately brought from distant counties. In February, 1754, it was stated that the distemper continued to rage amongst the horned cattle in the North Riding of Yorkshire and some parts of the county of Durham. In the month of December, more cows died of the reigning distemper in St James's Park. The malady continued more or less, as already mentioned, in 1755-6. In the month of April, 1757, we find it stated that the contagious distemper among the horned cattle had appeared at Lewisham, in Kent, and in some parts of Somersetshire. On the 28th of June the Royal assent was given to an Act 'more effectually to prevent the spreading of the distemper now raging amongst the horned cattle in the kingdom;' and in the month of October the justices of the peace for the county of Essex, at their general quarter sessions, prohibited all fairs and markets, in order to prevent the spreading the disease. After this little more was heard of the subject for some years. In 1758, it does not appear that any cases were reported, and in February, 1759, a day of general thanksgiving was ordered to be observed, because of its cessation. The malady lost much of its virulency towards its decline, and the proportion of recoveries was very much larger than at its commencement. For several reasons, no reliance can be placed upon the Treasury records as to the number of cattle that perished from it during its twelve years' reign, but it has been roughly estimated at about 500,000.[1]

In 1769, the disease continuing to ravage Holland, it was again introduced into England and Scotland towards the end of that year. On the 9th of January, 1770, his Majesty, in his speech to both Houses of Parliament, referred to it in these words: 'It is with much concern that I find myself obliged to open this Session of Parliament with acquainting you that the distemper among horned cattle has lately broke out in this kingdom, notwithstanding every precaution that could be used for preventing the infection from foreign parts.'[2]

[1] Much curious information respecting the invasion of the Cattle Plague, and more particularly the 'cures,' will be found in the Gentleman's Magazine and the Scots' Magazine for this period.

[2] The Annual Register, vol. xiii. p. 244.

The outbreak in England, alluded to in the speech from the throne, occurred at Stoneham, in Hampshire, in the winter of 1769, and appears to have attacked cows only; it was extinguished in January, 1770. Orders in Council, based on those of 1747, were issued, applying not only to Hants, but also to Dorset, Surrey, Sussex, Middlesex, and Berks.

In the *Scots' Magazine* for 1770, there is a great amount of information on this so-called Cattle Distemper. In the March number, it is said that 'the distemper among the horned cattle, the lamentable effects of which, in Holland, are related in our last, having made its appearance in this country, the gentlemen who have the honour to serve the King exerted themselves speedily, and we hope successfully, to stop its progress.' The disease was first supposed to have been communicated to cattle at Portsoy, in the county of Banff, by four packages of hay imported from Holland. Dr Cullen, writing on the 15th of April, 1770, says: 'It is needless to mention that the distemper made its first appearance at Portsoy, a seaport town situated on the Boyne, in the Moray Firth, about eight English miles to the west of Banff and four to the east of Cullen. In order, if possible, to eradicate at once such an alarming calamity, the justices of the peace of Banffshire resolved to destroy every horned beast in Portsoy and the neighbourhood, infected and not infected, and to bind themselves to see the proprietors fully indemnified of the value of the sound cattle. This was punctually executed on the 21st and 22nd of March, and the carcases, horns, skins, and all were buried about four feet underground. Then the dung of all the infected byres, with the upper part of the floors, were also buried, and the byres were thoroughly fumigated with tar and brimstone. The justices at the same time appointed all the cattle, within two English miles round Portsoy, to be daily visited by four of the most respectable farmers in the neighbourhood, who were ordered to make a report every day of the state of all the cattle within the circle of their visitation. Orders were likewise issued to all the Earl of Findlater's fishers on this part of the coast, prohibiting them, in the strongest terms, from assisting, directly or indirectly, to land any goods in a clandestine manner from any ship which

might happen to arrive on the coast. This happened about ten days before the prohibition by the sheriff and admiral appeared. For eight days after the Portsoy cattle were buried the inspectors reported 'all the cattle well,' and the most sanguine hopes were entertained that the contagion had entirely subsided; but, to the unutterable astonishment of everybody, intelligence was brought to Cullen, on the 4th of April, that one of the cattle of my Lord Findlater's tenant at Dytach, situated at the distance of about two English miles to the east of Cullen, three from Portsoy, and one without the line of circumvallation, was dead, and four more very sick. A meeting of the justices was held next day at Portsoy, when information was received that some cattle belonging to General Abercromby, of Glasshaugh, were likewise bad. The justices resolved to make one vigorous effort more to root out the infection, by ordering all the Dytach cattle, and all those belonging to the General which were kept in the same place with his sick cattle, to be immediately knocked on the head, and buried, like those at Portsoy. This resolution was carefully executed on Saturday and Sunday se'nnight. The justices at this meeting likewise resolved to enlarge the circle of inspection, and accordingly appointed inspectors for all the parishes of Cullen, Dellford, and Fordyce, who were appointed to visit and make report every day of the state of all the cattle within these parishes, which comprise a circuit of eighteen English miles at least. Hitherto no appearance of the infection had been discerned, and people began again to flatter themselves with the hopes that it is at last fundamentally rooted out. In the mean time the vigilance of the justices and of the people in the country is nowise relaxed. A report having prevailed here that the tenant of Dytach intended to discharge some of his servants who had been employed about his oxen, a positive prohibition was sent him not to dismiss, before the expiry of a month, any of his servants, and to keep them within the bounds of his own farm as much as possible. In a word, every precaution has been used that seemed in the least conducive to extirpate this very dangerous distemper.' The malady in consequence quickly disappeared. An Act received the Royal assent on the 16th of February, 1770, for indemnifying all persons with respect to advising or carrying

into execution his Majesty's Orders of Council, made for preventing the spreading of contagious distemper amongst the horned cattle, and for rendering the same valid and effectual, and for preventing suits in consequence thereof, and to authorize the continuing, extending, and executing the same for a further time. Dr Cullen's Memoir concerning the contagious disease affecting the horned cattle, contains a notice of this indemnification. 'The sheriff-substitute and justices of peace of Banffshire met at Portsoy on Friday, September 14th, 1770, and made a dividend of £799 12*s.* 2*d.*, issued from the tenancy upon the first certificate to the proprietors of the cattle which had been slaughtered in order to prevent the spreading of the contagious distemper then raging among them; as also to all others who had been in advance of money upon the same account.'[1]

At the court of St James's, September 14th, 1770, present the King in council, an order was issued, in consequence of the contagion among horned cattle having broken out at a village called Werlpen, between Furness and Newport, about four leagues from Ostend, in Flanders, and supposed to have come from the side of Berg St Wenon, about two leagues from Dunkirk, where it actually was. This order prohibited the importation of any cattle, or of any manner of hides or skins, horns or hoofs, or any other part of any cattle or beast, from Dunkirk or any other part of Flanders, or from any of the places mentioned in the aforesaid order of May 26th, 1769, into the kingdom of Great Britain and Ireland.[2] This aforesaid order referred to a new outbreak of the disease in the Netherlands in 1768, and prohibited the importation of cattle and hides from thence, as also from Denmark, Sweden, Holstein, Mecklenburg, and Hamburg. In December, 1769, the importation of hay and straw had been prohibited.

Towards the end of 1770, an Indemnity Act was passed, as it appeared 'there was no legal power to give these orders'—alluding to those issued in February, granting compensation for slaughtered cattle.

[1] The Scots' Magazine, vol. xxxii. p. 517. *J. Gamgee.* The Cattle Plague, p. 302.

[2] Ibid.

Dr Layard, writing to Sir Joseph Banks, President of the Royal Society, in 1780, mentions, amongst other matters, the outbreak in Hampshire. 'In consequence of the essay which I published in 1756, I was called upon in 1769 by Government to assist with my advice towards the stopping the progress of the contagious distemper among the cattle, which had broken out in Hampshire; and by mere accident I discovered how the infection was brought from Holland to London, and was conveyed into that country. Speedily and effectually to extirpate the calamity, no assistance was permitted to visit the infected villages, lest the farmers should be induced to prolong the illness by attempting to cure their cattle; but positive orders were issued that all the cattle should be killed, and buried properly, by which vigorous and salutary directions, the distemper ceased entirely in a short time.' The same Acts of Parliament and Orders of Council, to kill the cattle and bury them deep, succeeded also soon after in North Britain; and to the former Acts and Orders, issued in his late Majesty King George the II.'s reign, these alterations were made: in order that the infected cattle should be killed, without effusion of blood, by strangling; the hides to be neither cut nor slashed, but the carcases buried whole; and that all the fodder, litter, excrement, &c., should be buried, instead of being burned. Since that time, the contagious distemper has been brought twice into Essex, and once into Suffolk, from Holland, and as often stopped by the same means. His Majesty having most graciously been pleased in April, 1770, to appoint me to hold a foreign correspondence, the orders and regulations which had happily succeeded in Great Britain were communicated to the Dutch, the Flemish, and the French, and copies of all papers delivered to Baron Nolcken, the Swedish minister. In Flanders, and Picardy in France, the system of killing was adopted, and succeeded. Afterwards, in 1774, when the same contagion was carried into the south of France from Holland through Bordeaux, many attempts having failed to effect a cure, the devastation was at last stopped by no other means than by killing the cattle, as in Great Britain. And here I beg to observe, that Mons. Vicq d'Azyr, in his *Exposé des Moyens Curatifs et Préservatifs contre les Maladies*

Pestilentielles des Bêtes à Cornes, published by authority at Paris in 1776, says, p. 577: "That the salutary effects of the precautions taken in the Austrian Low Countries had excited the attention of the English, who by the same means got rid of the same calamity. They have exactly and scrupulously translated and put into execution the edicts issued from the Juntos of Ghent and Brussels, and their undertaking has been crowned with the most complete success." Mons. Vicq d'Azyr was misinformed, for, on the contrary, the late Mr Consul Irvine transmitted the Acts of Parliament, the Orders of Council, and my papers, containing every necessary instruction, to a member of the Junto of Ghent, whence they were sent to the Government at Brussels; and it was also a long while before the Juntos could be prevailed upon to adopt the system of killing, as they called it. It originated in England in 1747 (?), and it is certain that the Court of Vienna knew fully the obligations which the Austrian Netherlands had to the British Government, whose orders and regulations had been implicitly followed, and which Mons. Vicq d'Azyr says, p. 585, "He had modified and adopted to the rules of French government." In Flanders, the infection was also prevented from spreading a second time by the same method of proceeding; but, unfortunately, in Holland the cattle continue to be exposed to the same disease. The half-yearly returns which have been regularly sent me contain melancholy accounts of the severe loss of cattle; sometimes the whole have perished; at other times two-thirds have died; and generally above half fell when the sickness was less violent. In a country where the illness is become general, and constantly raging more or less, where the system of killing cannot now be thought of, and where inoculations have met with so many opponents of all ranks, there can be no other hope of getting rid of the calamity than by admitting into the United Provinces no other cattle than such as are sound, or recovered from the infection. (By the last half-yearly return from Holland, the number of infected cattle was so small, that it was hoped no further return to the States would be necessary.) I shall not trouble you, sir, with the returns from Holland, or the tables of inoculation in Denmark, which would too much increase the length of this letter; but only men-

tion, that in Denmark, where the contagious distemper is become naturalized and general, the Danish Government have not only wisely adopted the orders and regulations issued in Great Britain, but have with unwearied application pursued the practice of inoculation. Count Bernsdorff and Dr Struensee had all the necessary instructions, books, and papers, delivered to them by me, when the King of Denmark was in England; and I am assured by Daniel Delavul, Esq., lately his Majesty's Envoy Extraordinary at that court, that inoculation is approved, recommended, and by authority established. Even in the first three years that inoculation was practised, of near 300 head of cattle which were inoculated in a Danish island, not a sixth part were lost, notwithstanding the many disadvantages which unavoidably occurred. Professor Camper had before attempted to introduce inoculation in Holland, but the learned professor's abilities, diligence, and perseverance were so much counteracted by the obstinacy and interruption of the peasants, the badness of the situation, and inclemency of the weather, that out of 112 only 41 recovered, and yet that number is fully sufficient to prove his opinion of the disease, and of the use of inoculation. Application was made in 1770 to the Lord President of the Council by a famous inoculator, for leave to take matter from the infected beasts in Hampshire, and to inoculate the cattle in the southern and western counties of England: on a representation to his lordship that by such an operation the contagion would not only be introduced in those counties where it had not yet appeared, but also might spread the sickness so as to become general all over the kingdom as before, a positive and strict injunction was given to drop the intention, especially as by killing the cattle there was no doubt of extirpating the contagion out of Hampshire. The inoculator, therefore, made no attempt. According to the several prejudices of different countries, various opinions have arisen of the nature of this sickness. Such as are averse to inoculation have obstinately refused to acknowledge it was similar to the small-pox in the human body, and have very idly asserted that the only intention of declaring the contagion to be a sort of small-pox was purposely and with no other view than to promote inoculation for the small-pox.

'Others have positively declared it to be a pestilential putrid fever, owing to a corrupted atmosphere, and arising from infected pastures; but unfortunately for the supporters of this opinion, while the contagious distemper raged with the utmost violence on the coasts of Friesland, North and South Holland, Zealand, and Flanders, there was not the least appearance of it on the English coast, from the North Foreland to the Humber, although the coast and climate are the same. I shall not dwell on Mr Turherville Needham's elegant discourse read at Brussels, since he must have been convinced, when he came to England in 1776, that the illness was of another sort than he imagined; for such a proof of the efficacy of salt, recommended by him as an antiseptic in this disease, has been given as is positive and decisive, namely, that in Scania, a province in Sweden, where it is customary to place a large piece of rock-salt, called *salt stein*, in water, for the cattle housed to drink, all the cattle in that province were seized with the contagious distemper, and not one outlived it. Mons. Paulet, in his "Recherches sur les Maladies Epizoötiques," vol. ii. pp. 25, 26, Paris, 1776, has sufficiently explained Mr Needham's opinion. M. Bergius had insisted that the contagion was not of the exanthematous sort, and therefore inoculation must be of no use; but this opinion was also fully refuted by the late Professor Erxleben, of Göttingen, in his learned oration on the 20th of October, 1770. From every information, domestic or foreign, and comparing the several opinions, experience and observation plainly and completely determine the dispute. The disease among the horned cattle, so fatal in many countries, is not endemical or natural to Europe, although it is become so in Denmark from spreading all over the Danish dominions, and its long continuance in that kingdom. It is an eruptive fever of the variolous kind (in a letter from Mons. Vicq d'Azyr to Dr Layard, dated Paris, August 28, 1780, is the following declaration: "Il me paroît comme à vous que c'est toujours la même maladie qui a régné depuis 1711; *et qu'elle a de grands rapports avec l'éruption varioleuse*"); and notwithstanding the exanthemata, or pustules, may have been frequently overlooked, yet none ever recovered without more or less eruption or critical abscesses; but these differ from the pesti-

lential sort; no otherways similar to the Plague, but, like unto the small-pox, it is communicated by contact, by the air conveying the effluvia, which also lodge in many substances, and are thereby carried to very distant places. Unlike other pestilential, putrid, or malignant fevers, it bears all the characteristic symptoms, progress, crisis, and event of the small-pox; and, whether received by contagion or inoculation, has the same appearances, stages, and determination, except more favourably by inoculation, and with this distinctive and decisive property, that a beast having had the sickness, naturally or artificially, never had it a second time. Thus, sir, I have endeavoured to lay before you and the Royal Society the result of my inquiries, experiments, observations, and correspondence concerning this calamitous sickness, which from my situation in Huntingdonshire in 1756, it fell to my lot to investigate.'[1]

Mr Robert Dossie,[2] an eminent agriculturist and writer, in his *Memoirs of Agriculture* gives an excellent summary of the opinions held regarding the Cattle Plague at that time, and as it is in many respects a valuable document, it is here reproduced almost in its entirety.

'The first clear traces we have of the later introduction of the murrain into Europe commence in the year 1710 or 1711, at which time there are authentic accounts that it was observed in Hungary. Whether it was brought thither from other countries, most probably further to the south-east, or if not, how it was originally generated there, we have no lights that lead to any certain knowledge. But it was conveyed thence into Dalmatia, and propagated through that country to the neighbourhood of Padua, whence it spread over the whole of the Venetian state. It was soon afterwards disseminated through the whole of Italy, and passed, in 1713, through the Tyrolese into Germany; whence it communicated itself to almost every other part of Europe, as far north as Denmark and Sweden, introducing itself also about that time into Great Britain. After this, in consequence of more favourable seasons, the contagion abated by degrees in all the places where it had prevailed, and in about nine years the infection seemed to be exterminated in most of them. There is reason to believe, notwithstanding, that some lurking remains kept their ground

[1] Philosophical Transactions, 1780. *J. Gamgee.* Op. cit.
[2] Memoirs of Agriculture. London, 1771. Vol. ii.

in parts where the relaxation of moist air, and the debilitating effects of putrid vapours, rendered the cattle more susceptible of all contagion. For, in the beginning of the late king's reign, the disease revived here to such a degree as to give occasion to the Government to make some regulations for the suppression of it, though after a short time the infection again seemed to have been extinguished. It also appears to have shown itself in some parts of Germany even to the year 1730.

'In the year 1740 or 1741, this disease again broke out in the south-eastern parts of Europe, and made its progress through the same countries as in its former course after 1710.

'It was brought hither in 1744 or 1745, from Holland, as is believed, and made great devastation of the cattle for several years, after which it declined considerably, but took fresh vigour in 1756, and continued to rage with considerable violence for some time. It then abated gradually, and, as far as appears, the infection, at length, was wholly lost; as for a number of years we had not the least signs of it before the autumn of the last year, and since, when it is believed to have broken out afresh in two or three places of the island, though not, as there is reason to believe, from any relics of the former, but the introduction of a new contagion brought from other countries. In the mean time, though we have been free from the murrain for a number of years, yet it has during that period visited other places. Denmark and Jutland, in particular, felt it in 1769, with greater severity than has ever been known elsewhere. The United Provinces have undergone a yet harder fate, from some disadvantageous circumstances in the temperature of their climate. For since its first introduction, in 1741, it has never entirely left them, but maintained its ground, though with various degrees of violence, at different times; and at present it makes great ravage in the parts of those countries where cattle most abound.

'These latter invasions of several parts of Europe by the murrain, have furnished the opportunity of making the following general observations on its effects and consequences.

'It is to be remarked that as the infection of this disease prevails only at particular times anywhere, and acts with greater violence at some times and in some places than others, according to the preceding view of its migration, so it affects only part of the cattle anywhere, and those with various degrees of malignancy. This leads us to explore in what this difference of the cattle's being susceptible of the infection, or exempt from its effects, when exposed to it, may lie. On examination of this matter it will appear that where the infection does not before subsist, it never comes but after some general cause has weakened the habit of the beasts in general, such as very severe cold, long-continued

want of a sufficient quantity of wholesome food, repeated alternations of heat and cold in the weather, moist air replete with putrid vapours, a long continuance of easterly winds, or, what is more frequent, a combination of two or more of these causes together. Thus we find this contagion invading every part of Europe after the year 1711, when the season had been so inclement the year before as to destroy a great portion of the sheep in England; and again in 1741, as mentioned above, after a very intense frost, which lasted from December to April, and by the rigour of cold and scarcity of fodder, had reduced the cattle in general to a debilitated state, which was still aggravated by the almost constant easterly winds that blew the summer and autumn following. After the abatement of it, in more clement seasons, which followed that period, we find the disease resuming its force again in various places, since that time, by similar accidents. We see, also, that from the same principles it has long maintained its ground in countries where moist air and vapour of stagnated water disposes to agues and other diseases that come from the laxity of the fibres, which disposition is equally produced by these causes, in the brute and human species. While, on the other hand, it has been extinguished in places where a drier and purer air gives robustness and vigour of constitution to the animals, it had been observed, also, that the infection, when it has abated during the summer or winter, has generally resumed fresh vigour in the spring and autumn, when the alternations of heat and cold have disordered and weakened the beasts.

'The same principle, with respect to the cause of the prevalence of the contagion, holds good as to the particular beasts which are seized with the disease, or escape the contagion when exposed to it. For we see, in all cases, it is the weaker which are attacked by it, and the stronger which remain free from it. It is ascertained, by a very sufficient basis of remark on facts, that the beasts of a black, dark, or red colour, either wholly or in mixture, are less subject to the infection than those which are white, or of a light mixture of colours; and the concurrent observation of all times has established the belief that this difference of colour is an indication of the greater or less degree of natural strength of the beasts, as well in neat cattle as horses. It is equally certain that bulls are less subject to the infection of this disease than oxen, oxen than cows, cows not pregnant than those which are; and, among all these, such beasts as appear naturally of a feebler make, or are debilitated by any accidental suffering.

'It is manifest, too, from an equal ground of observation, that the same difference in strength and weakness which renders the cattle more or less susceptible of the infection, makes them more or less liable

to the violence of the effects of it. Those which are weaker from any of the above causes have more aggravated symptoms, and more frequently die of the disease in proportion to the degree of such causes.

'It results, therefore, from these circumstances, that though infection conveyed from some beasts diseased with it is the efficient cause of the murrain in cattle, yet there is a predisponent cause, or particular state of the subject, absolutely necessary to its acting or taking effect; and this predisponent cause is the condition of the beast with respect to weakness of habit or relaxation. It appears, also, that this weak state of the beast may arise from general causes, either of an epidemic nature, affecting whole regions, such as inclemency of season, or scarcity of wholesome food; of an endemic nature, affecting only particular places or countries, such as dampness of the air, or abundance of putrid vapours; and it may be produced also from some particular cause regarding the individual only, such as original weakness of constitution, pregnancy, or debility occasioned by some accidental suffering.

'The susceptibility to the infection, and the predisposition to be more violently affected by it, in consequence of the weakness of the habit, are neither peculiar to cattle nor to this disease. It is evident, from what offers in a very extensive field of observation, that both mankind and brutes are liable to the attacks of most contagious disorders in proportion to their defect of strength. Even were it not so well verified by notorious facts, a theoretic proof might be drawn from incontestable principles of physiology, and from the constant effects of medicine administered in such cases. But this is too wide a range of subjects to be entered on here, and would, besides, requires a previous acquaintance with medicinal science in order to its being understood. That beasts are liable to take the infection of the murrain, and suffer more from it, in proportion to their weakness, is sufficiently obvious from just remarks on the subject itself; and it is very necessary to be understood and taken into consideration in all practical disquisitions on that disease, because it constitutes a principle which admits two very useful applications. It not only affords the means of prognosticating when great numbers, or single particulars, will be seized with the disease, if exposed to the contagion, and, consequently, supplies the proper notice and warning for the use of preventive methods; but it furnishes, likewise, the true indication of cure, and points out what the regimen should be that will counteract the disease.

'The manner in which the contagion may be conveyed is likewise a matter of great moment in the consideration of the murrain, with a view to the preventing its injurious effects.

'The observations already made on facts have not set everything

relating to it in a clear and decisive light. There are some opinions respecting it, in which all agree, because they are supported by evident instances; but there are others which, though they have the sanction of common assent, may yet be disputed on very just grounds. It is unquestionably certain, that the murrain is communicated by transmission of some contagious matter from beasts which have that disease to those which are sound; but that this is done by all the means of communication generally supposed is not at present so manifest a matter.

'The effect of inoculation in the murrain, as well as a great number of other palpable facts, render it plain that the contagious matter may be carried by other bodies, which receive it from the diseased beast, and convey it, by actual contact, to the sound. This may be performed by any substance to which the infecting particles can adhere, but is most likely to happen, through accident, by the mediation of any body that is of a hairy, woolly, or pilous texture,[1] because the matter is much less liable to be rubbed or cleansed off from such bodies, than from those which are denser and have an entire and smooth surface.

'But there is another mode of conveyance of the infection, which, though it must be allowed to subsist with regard to some contagious disorders, admits of a doubt with respect to the murrain, that is, the communication of the contagion by the air. It is in general taken for granted that the air is the chief vehicle of the contagion of this disease, and several means of prevention of its action have been instituted on that principle. But there is no clear fact which in the least proves this notion, and the universal failure of the preventive means founded on it, furnishes arguments against it, as far as anything at all can be thence inferred. On the other hand, a great number of circumstances seem to evince that the cattle are never infected but by an actual conveyance of the contagious matter, by means of contact of a sound beast with one that is diseased, or with some other body, which receives first the viru-

[1] It has, however, been strangely made a matter of doubt by some eminent professors in the United Provinces, whether the skin itself of a dead infected beast would impart the contagion, and they have even asserted the negative, in consequence of the result of certain experiments made for the determination of this point. But some fallacious circumstance attended those experiments, as appears even on the face of the relation. It would, indeed, require very strong proofs to gain assent to such an opinion, than which a stranger paradox can scarcely be advanced. It is evident the infection is conveyed by other substances; and nothing can be more suited to collect and retain the matter of it than a hairy skin. The matter must, undoubtedly, abound in the skin of the beast which generates it, whether it be evacuated by the perspiration, saliva, or any other excretion. Indeed, whatever other bodies convey it must in general receive it from the skin, which, if it can impart the same to them while the animal is living, must, in common with other bodies, retain it a certain time after the beast is dead.

lent matter from such beast. There are many instances where good fences, and other effectual means of exclusion of whatever could bring the infecting matter, have prevented the cattle in particular places from suffering by the contagion, though surrounded on every side by numbers of beasts seized with the disease. In some of these places the cattle have escaped to the last. In others, after a time they have taken the infection in consequence of known accidents, which occasioned the introduction of the contagion, from the actual conveyance of it by somewhat that had received the virulent matter from a diseased beast. Where the neighbouring infected cattle were, in these instances, all on one side the place in which those that escaped were confined, this exemption of them might be reasonably imputed, as it has been, to the wind blowing the contrary way, and carrying off the contagious effluvia that might have otherwise reached them. But this solution of the difficulty cannot hold good, when, as has been frequently the case, the free place where the cattle escaped was surrounded by infected beasts on every side. The determination of this point is not merely a speculative object, for it settles the proper nature and limitations of the means to be used for the prevention of the communication of the infection, and rightly confines them to such as regard the hindering the contact of diseased beasts with the sound, or the exclusion of bodies which may convey the virulent matter from the one to the other.

'From the facts which have appeared respecting the disease, there is reason to infer that the contagious matter retains its infecting power a considerable time. The contagion is believed in several instances, from very strong circumstances, to have been conveyed to remote places in bodies transported by sea, as the known intercourse with the countries whence it was presumed to be brought palpably suggested that manner of its introduction, which could not be otherwise accounted for. Some of the later experiments with regard to the inoculating cattle with the disease show this fact with greater certainty of proof. The precise limitation of period in which the infecting matter will keep its power is not, however, well ascertained by any observations or trials; but there is room to conclude that, under some circumstances, it will act at a considerable distance of time from its being generated. We see the variolous matter will communicate the small-pox after many months; and there is no foundation for any doubt of the analogy betwixt the contagion of that and of the murrain in this particular. But it is a matter of great consequence, and this should be decided by adequate experiments. Because the knowledge of it is of great moment, in judging of the proper means and regulations for preventing the introduction of the contagion into places free from it.

'The space of time, likewise, betwixt the beasts receiving the infection and the perceptible effects of it, is not yet precisely settled by accurate observations. But there are well-known facts that give us a considerable degree of information with regard to it. In general, appearances will be found in three or four days; in some few instances they may not come on till six or seven. We may state the latter time as the utmost period, unless when the beasts are very slightly affected with the disease, and then, where the symptoms may not be discernible till it be in its most powerful state, ten days may be allowed. If a beast, therefore, suspected to have received the infection, do not show any signs of it in six or seven days, there will be very little danger of its being seized; and if none appear in ten, it may be taken for granted that there is no infection in the case.

'The time for detaining cattle in any place to which they have been removed, after having been exposed to a risk of the infection, in order to prevent their spreading the disease to other parts, may be therefore limited to a fortnight, since there is not the least hazard after such time of their being seized with the disease, in consequence of their having been exposed to the contagion so long before.

'These are the general facts and observations respecting the murrain which have hitherto presented themselves. It is proper to subjoin that, as before intimated, this disease has various appearances, symptoms, and degrees of mortality, at different times, and in different places; as the epidemical effects of the seasons, or endemical circumstances of particular countries, have interfered with the natural process of the disease. In the United Provinces a profuse diarrhœa, or looseness, is a very common symptom, and generally carries off the beasts by exhausting their strength; but, where they do not recover, it seems to be the critical evacuation by which the virus of the disease is discharged. Eruptions more rarely attend the murrain in that country, though they are not always wanting. On the contrary, in Great Britain the looseness seldom happens, and is mostly a mortal symptom, though, in some few cases, a salutary one. Eruptions occur much more frequently, and are generally the critical deposit of the virus when the beasts recover. In Denmark the disease, when it made its furious attack in 1759, was far more violent and mortal than it was ever known in England or Holland, or than it had been when it infested the same places before. The fatal crisis was then very rapid, the beasts dying in two or three days, and some sooner, after they first appeared to be affected. At some periods, remarkable blisters on the tongue are related to have been an early and general symptom of this disease;[1] they are not near so frequent now,

[1] There is, as was above observed, another contagious disease of the cattle, of

and only found at or towards the end of the disease. Like variations are, as above intimated, seen in other malignant contagious diseases: and render an accurate observation of the symptoms, when they break out fresh at a distance of time, necessary to the forming a just description of them, in order to the distinguishing them with certainty from others which are similar.

'As the mortality of cattle occasioned by the murrain has been a very great evil to many countries, means for the prevention or cure of it have been earnestly sought after by great numbers of physicians and others. But this research has been made with very little success anywhere, either with regard to the interest of the proprietors of the cattle or benefit to the public, except what relates to the introduction or spreading of the infection into places or countries free from it.

'Among the means of prevention of the murrain, those the most generally adopted, though the least effectual to the end, have been the attempts to render the places where beasts are kept, or the beasts themselves, insusceptible of the infection. In this intention, by an imitation of what the ancients recommended and practised as preservatives against the plague, fumigations, scents, and external medicaments employed on the cattle have been almost everywhere used.

'With respect to fumigations of the places where beasts are kept, all confidence in them must fall to the ground whenever the opinion of the air's being a vehicle of the contagion is refuted, as they were performed with a view to destroy the putrid effluvia with which it was supposed to be impregnated, and which was considered as the matter of the contagion. But these fumigations frequently repeated, as they were for this purpose, in close places where the beasts were confined, were not only ineffectual to that purpose, but noxious in a considerable degree as being conducive to the prevalence of the contagion. For, being in general made with bodies that afforded an acrid steam, such as sulphur, vinegar, tobacco, or terebinthinate substances, they injured the respiration of the beasts, and thence, diminishing the animal strength, rendered them more disposed to be affected by the contagion.[1] A multi-

which blisters on the tongue seem, from the accounts of it, to be a constant, principal, and characteristic symptom; and proper care, therefore, should be taken to avoid confounding this disease with the murrain, either in reading or practice. It appears to have been curable, in most subjects, solely by opening the blisters; and is therefore evidently of a much less malignant nature than the murrain; in which, as is well known, from many trials, that operation would be of very little avail. This circumstance alone would give a sufficient criterion for distinguishing the one from the other. (Mr Dossie is here speaking of 'glossanthrax.')

[1] A free respiration of fresh undepraved air is essentially necessary to the strength of the beasts, in order to their resisting the effects of the contagion. It has appeared,

plicity of facts confirm the truth of this remark, as it appears from nearly all the accounts given that the greatest number of beasts have been lost where means of this kind have been most employed.

'The medicating the cattle externally by rubbing them with sulphur, gunpowder, tobacco-water, and other substances does less harm than the fumigations, but not more good, as experience has largely evinced. The same may be said of those extraordinary mundifications, or cleansings of the hair and skin of the cattle, which have been recommended and practised on the same authority of the ancients. There is reason to conclude that the contagion, in whatever part it is first imbibed, takes effect too soon to be rubbed off in time; and it is most reasonable to suppose, if the infection be at all absorbed by the skin, this great cleansing of it may fit and prepare it to receive the contagion rather than defend it against its admission. All the supposedly preservative methods of this kind, though they have the authority of many writers from an implicit submission to the more ancient, have been found as vain and fruitless in practice as they seem absurd in speculation, when examined on the just and demonstrable principles of physiology.

'The use of the internal medicines, administered as antidotes to fortify the beasts against the attacks of the contagion, have been equally inefficacious or detrimental with the external means. Those of the medicines that have been recommended for this purpose, which come within the class named alexipharmic, and are proposed to combat the virus, are entirely inadequate in their degree of power to the intention, though some of them, by their invigorative qualities, may have a tendency to oppose the effects of the contagion. Those which have been adopted as antiseptics or resisting putrefaction, such as sulphur, oil of vitriol, vinegar, &c., when given as preservatives against the contagion, must of course be administered out of season. Since putrefaction in the fluids of the beast is the consequence, not the cause, of the contagion, and, therefore, cannot take place till the contagion be received, nor, as it did not before subsist, can it admit of being counteracted till then. Moreover, the substances of this kind, which are of an acid nature, have,

from a number of observations which are recorded by the writers on this subject, that the cattle which have been kept out in the air, when the weather was not inclement through too much cold or moisture, have been less subject to take the infection, and recovered in greater numbers when seized with it, than those which were housed. In Denmark, during the terrible visitation mentioned above of this disease in the year 1759, many of the boors attempted to preserve their cattle from the infection by the fumes of tobacco, which they continually smoked in the cow-houses, even sitting up the whole night in turns for that purpose in the midst of them. But it was remarked that scarcely any of the cattle so treated avoided the contagion and death in consequence of it.

in this case, a contrary tendency to that of resisting the effects of the contagion. For, destroying the bile, and checking, by other means, the digestive ferment, as well as lowering the *vis vitæ* from some other less known power, they weaken the habit of the beasts, and consequently dispose them to receive the infection more readily, and suffer, with less resistance, its action in bringing on a putrescent state of the fluids. It has been, therefore, everywhere found that, whenever any of these methods have been pursued, more beasts have been lost than when they were left to the friendly assistance of nature undisturbed, and only secured from those accidents that would injuriously affect their health in all circumstances.

'There is another proposed method of saving cattle from the mortal effects of the murrain, of which some trial has been made, that properly comes under consideration along with the preceding. Because, though it is not, indeed, the preventing the infection, but, on the contrary, the giving it, yet it is calculated to answer the same end, that is, the preventing the ill effects of the contagion by anticipative means. This method is the inoculation of the cattle with the murrain, in the same general manner as is practised with mankind for the small-pox. The fact is well known that beasts which have had the murrain from accidental infection, like mankind with regard to the small-pox, do rarely take it again; and it being presumed on this ground that the analogy betwixt these two diseases still holds good in other particulars, and, consequently, that the communicating the murrain by inoculation would have the same consequences on the cattle in preventing their receiving the infection again, and in rendering the symptoms of the disease proportionably milder and less fatal, it was imagined the use of this method might be, in a considerable degree, a substitute for a preservative from the infection itself. But experience has evinced that this presumption was erroneous in point of fact; and there is, besides, one essential circumstance of difference betwixt the murrain and the small-pox which constitutes the use of inoculation detrimental in the former, even if it were productive of the same consequence as in the latter, with respect to the mitigation of the symptoms or the prevention of future infection. The experiments made to explore the effects of inoculation in the murrain, though not all alike in their result, have yet given sufficient lights to determine that they are very different from those of inoculation for the small-pox, and that it can in no degree answer the same end, even with respect to the particular beasts subjected to it; much less can it conduce to the restraining and diminishing the mortal effects of contagion in any manner that may be beneficial to the public.

'In the first place, it is sufficiently proved from instances that the

inoculation of beasts for the murrain does not hinder their receiving the infection again, as other cattle, by accident. This may seem very extraordinary on the first view, because, when the cattle take the infection by casual means and recover, they are rarely subject to have the disease a second time, and because we see inoculation for the small-pox prevents the ill effects of future contagion in the same manner as a casual infection. But reasons drawn from analogy, however just they may be in support of supposition, cannot conceal facts; and though the cause of this difference betwixt the small-pox and murrain be of a dark and inexplicable nature, yet nothing is to be thence inferred against its reality as the subject itself is so in all respects. For there has been no satisfactory reason hitherto assigned why the having either of these diseases once, by any mode of infection, should be preventive of the future effects of the same contagion. Whatever difficulties may attend the accounting for it, we yet find on a revisal of the relations of the trials of inoculation practised for the murrain, a considerable number in proportion to the whole are known to have actually taken the infection afterwards, and that of these the far greatest part died of the disease.[1]

[1] There are many instances of cattle taking the murrain a second time after having just before had it by inoculation. Noseman, and two other Dutch physicians, were among the first who performed this operation in Holland. The beasts they inoculated were seventeen in number, and out of them three recovered, but took the infection again by accidental means a fortnight after in so violent a manner that two of them died. Professor Grashuys inoculated six beasts, which recovered. All of them took the infection again by accident, and four of them died. There is an account,'in the experiments of the Marquis de Courtivron, of two calves that were inoculated twice without any apparent symptoms of the disease being produced. But they took the infection without any operation afterwards from other cattle having the disease from inoculation, and one of them died. In an experiment made last year on the inoculation of cattle for the murrain, in consequence of a subscription formed for that purpose in Friesland, and reported to the States-General of the United Provinces by Professor Camper, it appears that out of ten which recovered after being inoculated the 5th of July, five took the disease again by accidental means, and all died. In the continuation of the above experiments, seven beasts which recovered, after being inoculated July 20th, all took the infection again casually afterwards, and were carried off by the disease. It may seem difficult to conceive why more of the cattle that have recovered from inoculation, and taken the disease afterwards, should die of it than of those which have not been inoculated, and are casually infected with it. But as inoculation does not, similarly to what is found in the small-pox, prevent the future action of the contagion with equal power, nor render the symptoms less violent when the disease is received by that mode of infection, than when in the natural way, there is room to conclude that the weakened habit of the beast, in consequence of the injury done by the disease in the inoculated subjection to it, renders the effects more fatal in the second attack according to the principle we have above specified.

We may reasonably presume, thence, that others of them might take the infection after the accounts were written, or under circumstances which might prevent the writers from attaining to the knowledge of it. It must likewise be considered, that among the beasts inoculated a part must have been such as were not constitutionally susceptible at all of the infection by casual means, and therefore did not take it afterwards on that score. But, if we reason on the simple fact alone, that a considerable proportion of the number of the beasts inoculated have had the disease again, and with at least equal violence and mortality as those not before inoculated, we must grant that this practice cannot any way answer the end proposed, which is solely that of preserving them for the future against the bad effects of the contagion.

'In the second place, it is likewise evinced by the same testimony of facts, that the infection communicated by inoculation is not attended with less violent symptoms and mortality than when received by casual means. The accounts of the practice of that operation fully justify this assertion.[1] Hence, therefore, as well as for the last-mentioned reason, inoculation appears evidently to fail of its intended purpose.

[1] There are many instances, in the relations given of the trials of inoculation for the murrain, of the beasts dying in a great proportion to the number subjected to it. Amongst them are the following :—Noseman and his two colleagues, as we have before had occasion to mention, inoculated seventeen, of which fourteen then died, and two of the others, which had recovered from that infection, took a fresh one casually, which appeared stronger, and carried them off. So that only one was saved out of the seventeen. Doctor Fountayne, Dean of York, had four inoculated, and lost one of them. Doctor Layard inoculated eight beasts, of which five died, and he killed another for inspection, which otherwise might have been added to them for anything that appears. Four beasts were inoculated for the murrain in the spring of the year, by order of the States of Utrecht, all of which had the distemper with great violence and died, as appears in the report made to the states of that province of the opinion of some eminent physicians they consulted, and of the result of this experiment. The following numbers died from the inoculation performed in consequence of the subscription mentioned in the preceding note, made last year for that purpose in Friesland. Out of twenty-five head of young cattle inoculated the 5th day of July, ten died, besides five others which, though they recovered, took the disease again afterwards casually, and then died of it, as before related. Out of twenty-five that were inoculated the 20th of July, thirteen then died, besides the seven before-mentioned, which, having recovered, caught the infection by accidental means afterwards, and were carried off by it. Out of fifty-eight that were inoculated the 9th of August and took the infection, twenty-five died of the disease then, and five more died soon after of a pulmonic decay occasioned by it. Four other beasts were inoculated on the same 9th of August, in which the infection failed. They were again subjected to the operation, the 18th and 19th, in a similar manner, and, taking the disease then, two died at the time, and a third soon after, from pulmonic abscesses brought on by it. In

'The total insufficiency of inoculation to answer, in the case of the murrain, the end proposed, on the score of both the preceding circumstances, would be a sufficient ground for exploding the practice of it. But there is a yet stronger reason against its use, which arises from this principle:—The murrain is, at least with respect to the European countries, an epidemical disease, though contagious. That is, it does not, as we have observed before, ever reign but when certain unfavourable circumstances of season have created a predisposition in the cattle to receive the infection, and thence rendered them temporarily susceptible of it. When the effects of these unfavourable circumstances of season cease the effects of the contagion cease likewise, as far as regards accidental infection; so that when the consequences are left to the natural course of things, this disease is only a temporary mischief, to which there is some certain period, though that period may be different, as we have seen above, from the various condition of different places. Now, if the inoculation for the murrain were practised in so general and continued a manner as to render it of any public consequence, supposing the inoculated beasts incurred less danger from the disease by that mode of receiving the infection, and were more secure from future attacks of it, the contagion must be spread in proportion to the extent of the country where the operation is practised, and must also be constantly kept up in good as well as bad seasons. Hence all the natural means of the contagion being exterminated in the favourable times would be wholly taken away, and in the bad times there would be necessarily a great

these instances taken together, we find a far greater proportion of the cattle destroyed by the murrain given by the inoculation than would have been by the infection taken in the natural way. Professor Camper says, nevertheless, 'That such ill success should not discourage the future pursuit of inoculation for this disease, because the same miscarriages happened on the first introduction of this operation for the small-pox into our parts of the world.' But I must beg his pardon for saying that this is an inadvertent assertion, and that he is entirely mistaken in the matter of fact. For the inoculation for the small-pox was equally successful at first as now; and though extraordinary stress has been lately laid on some particular methods of treatment supposed to be new, yet, where they have not been followed, we have two instances of a greater list of recovered patients in proportion to those which have been lost under the same conduct, than can be produced on equal authority by any of the pretended improvers of this practice. Some few out of great numbers have at all times died of inoculation for the small-pox, but never in any proportion to the beasts, which appear in the relations here cited, to have died from inoculation for the murrain. It was the striking examples of success which could alone have introduced and established the use of inoculation for the small-pox here, and it would have been rejected with horror, and prohibited by authority, had a similar failure to that which has been experienced in the murrain been found in the result of the first trials.

destruction of such beasts as neglect or the casual want of opportunity of inoculation had left exposed to the rage of it. This we see happen at present with us, in the instance of the small-pox, from the very extensive dissemination of the infection by inoculation. But this disease differs very materially from that of the murrain, with relation to that operation. For we find no instance of the contagion of the small-pox being ever totally suppressed in any country where it has once gained admission; and therefore, if general inoculation mitigate the effects, it may be adopted for that disease without the mischief of causing a perpetuity of the contagion, as would happen from a general practice of it for the murrain, the contagion of which will otherwise spontaneously cease in certain periods, as past events have incontestably manifested.

'The failure of inoculation to answer its intended purpose, as evinced by the instances above quoted, and others, has disposed the favourers of it not to insist on its utility when practised on cattle in general. But Camper, De Monchy, and some others of those who have most lately given opinions on this subject, still continue to recommend it to be performed on calves, or young cattle. But even admitting a greater number of them than of older cattle might recover, when subjected to it, yet, if it be not, as we have above shown good reason to believe, a security against future infection, it can be of no utility. The objection, moreover, against the general use of inoculation, with regard to its spreading and perpetuating the contagion, avails equally against the inoculation of the calves as the adult beasts. For what will secure the other cattle from this infection when the calves have the disease in places near them? Will not this universal propagation of the contagion, in spite of all the care that can be taken, of course occasion its frequently reaching some of the older cattle; and will they not infect each other the same as at present, only in a more general manner? It may be answered that, if all the calves be inoculated, the whole stock of cattle would in time be rendered insusceptible of the infection, and therefore not subject to this mischief. But if, which is, nevertheless, denied, for the reasons before specified, the inoculated cattle were rendered incapable of having the disease again, yet the detriment arising from the above-explained effects of such a practice, before it could possibly be extended in any general manner, and the impracticability of making more than a part of the people conform regularly to it, would be extremely great. This plan has, besides, the further inconvenience of being incompatible with any supply of foreign cattle in places of great scarcity, for the contagion being spread everywhere by the constant inoculation of the calves, such foreign cattle would of course be affected by it, which must produce such a loss to the dealers in them as

would deter any persons from venturing on so dangerous a trade; whence the public distress would be greatly enhanced by the scarcity of all cattle thus occasioned.

'We may, on the whole, conclude that no general effectual aid is to be obtained against the murrain, in a preventive intention, by medicinal means. For such as might avail to a certain degree in nature are rendered impracticable from economical reasons. Whatever is done of this kind to answer any real purpose, must be extended to all the cattle in every stock, at least, where there are not very particular signs of strength, which will be found only in few. It must also be continued, or at least renewed at short intervals, during the whole time the infection is in the neighbourhood, as no foresight can point out what accident may convey it to the beasts. This must cause much expense in the purchase of the medicines, and constant trouble in the administration, which is in fact equal to expense. Professor Camper says, nevertheless, that nothing affords a greater prospect of success than preparing the humours, while the cattle are yet in health, as the contagion approaches. But he seems aware, however, that the medicine which could be most depended upon for this purpose, the Peruvian bark, would be too dear to be administered in that profusion which is necessary; and therefore he proposes the finding some substitute for it, intimating that he considers the willow bark as such. But, unhappily, it is well known that neither the willow bark nor any other hitherto discovered simple is an adequate substitute for the Peruvian bark, and, though they have a degree of the same power, and may be joined with it to make some saving of the quantity, yet, given alone, they are not to be depended upon and deemed equal to the intention. The expense of the Peruvian bark, or of strong fermented liquors or cordials, the only efficacious means of invigorating and keeping up the sanative strength of the beasts, would be apparently more burthensome to the proprietors of cattle than that of replacing such of them as might be carried off by the disease. Since to put a large herd of cattle under a medicinal regimen, and continue it so for a long time, would most obviously be attended with a certain great loss for the precarious chance of avoiding another loss that, at worst, could not be equal to it, nor possibly incurred at all, and would therefore be neither advantageous, nor in general practicable, as many proprietors of cattle could not find resources for making so considerable a disbursement.

'The remedies which have been tried for the cure of the murrain have been in general as inefficacious and absurd as those employed for its prevention; and though some few have been better chosen with respect to the intention, yet they never appear to have been well used as

to the manner of administration, whence we have very few certain instances of their success. The far greater part of these medicines, like those used for the prevention of the disease, have been taken up on the authority of the ancients and the earlier writers, and consist of a jumbled variety of those medicaments which are deemed antidotes of poisons or alexipharmics. Under this class have been given theriaca, mithridate, diascordium, opium, camphor, balsams, frankincense, myrrh, juniper berries, camomile flowers, marigold flowers, feverfew, rue, sage, fenugreek, madder roots, grass roots, horse-radish, bay leaves, mustard seed, snake root, contrayerva root, turmeric, savin, moth maslein, spearmint, calamus, aromaticus, garlic, onions, leeks, testaceous powders, sulphur, vinegar stalks, honey, raisins, figs, blood of a tortoise, and eggs. Some present physicians on more modern, but perhaps not more just notions, have exhibited to the beasts several of the above and other simples, under the name of antiseptics, in another intention; it is that of resisting putrefaction, in which they principally place the cause of this disease.[1] The chief of the remedies of this class they have adopted

[1] The antiseptic class of medicines has not much more claim of propriety and efficacy in the cure of the murrain than that of the antidotes and alexipharmics. Though a putrescent state of the fluids be the consequence of this disease in the second stage, when the effects are violent, yet it does not seem to have any concern in the cause, nor from any marks even to come on in the first stage. The effectual method, therefore, of doing somewhat that may resist the putrefaction is to mitigate the violence of the disease, which can only be effected, as far as hitherto appears, by keeping up the natural strength of the beasts, through the use of an invigorative regimen. The action of those remedies called antiseptics may be therefore well doubted, as we shall have occasion to take notice more particularly below, with respect to their immediate effects in that intention in any febrile cases, and more especially in the murrain. Notwithstanding they check putrefaction in inanimate animal substances, yet, in living subjects, being taken into the intestines, their nature is changed by the digestive operation, and they do not pass into the habit with the same qualities, but as a part of the chyle in which such qualities cannot exist. Those of them that contain the astringent gums which have the property of tanning, such as are found in the Peruvian bark, &c., may promote this intention indeed secondarily by invigorating the solids, accelerating, consequently, the motion of the fluids, and thence aiding the natural ferments, which are the cause why putrefaction does not take place in the juices of the living animals. But the acid kinds of the antiseptic medicines have even the contrary effects in febrile cases. For, diminishing the irritability, they lower the *vis vitæ*, and they prevent digestion by checking that particular ferment by which it is performed. Whence, in both ways, they lessen the animal strength, and of course conduce to the putrescence of the humours. These antiseptic remedies, moreover, can have no effect on the habit in that stage of the disease where the putrescence actually takes place, because the digestion is then totally lost, as we shall see below, and the medicines, when taken, either remain in the stomachs of the beasts, or pass off in the colliquative purging. It is thence we may account for the greater mortality of beasts so treated.

are the vitriolic acid, vinegar, verjuice, sour dough, butter-milk, common salt, and sal ammoniacus. Others, who are attached to the doctrines of another modern school, considering this disease as inflammatory, have administered medicines they hold as emollient and sedative, of which nitre, cream of tartar, acids, mucilages, and oils are the principal.[1] Mercurialis, antimonialis, and white vitriol have also been employed in the intention of febrifuges by some of the present physicians, who are favourers of chemical and metallic medicines.

'But alike has been the success of all the proposed remedies of these several classes, which is, that a remarkably great number of the beasts to which they have been administered have died, in proportion to that of those which have been left to nature. This may appear strange, but the fact is that all of these medicaments which have any operation, except those which have an invigorating and strengthening quality, disturb, in some way or other, the animal economy, and, thence weakening

[1] How far the notion, that the mortal effects of febrile disorders in general depend on inflammation, and that the indications of cure are to be thence deduced, may be just, does not make a proper object of examination here, though, perhaps, a medical error in this point has not only been destructive to many cattle in cases of trials to cure the murrain, but to a greater number of mankind than were ever saved by all the means of medicinal art. But however that may be, it is obvious the murrain cannot be classed amongst inflammatory disorders when the symptoms of it, that will be below investigated, are duly considered. It must be allowed, indeed, that when the whole animal economy is perverted by this distemper in the second stage of it, the efforts of nature to relieve herself from the discrasy of the fluids, produce inflammation in particular parts, the marks of which are constantly found. Inflammation is not, however, in the murrain, even the secondary cause of the disease itself, as it is in the small-pox, plague, and some other febrile contagious distempers of mankind, but the last consequence of it in the most advanced state. On the contrary, the symptoms of the first stage of the murrain, and frequently of the second, exhibit no signs of general inflammation, but of general and partial weakness. A lentor of the animal action, a stupor, and a paralysis of the head and digestive organs, are, as we shall see below, the first visible effects. When these are aggravated so as to prevail over the efforts of nature to perform the vital functions, the disease necessarily proves fatal; but where the animal strength is sufficient to resist for a certain period, the disease terminates by a critical discharge of the virus or morbid matter, and the beast recovers. Certainly, therefore, the treating the murrain as an inflammatory disorder by the exhibitions which diminish irritability, and lessen the *vis vitæ*, or animal strength, is conspiring with the efforts of the contagion to bring on the destruction of the beasts, as those efforts prevail according to the weakness of the subjects. It must be admitted, indeed, that the medicines administered in this intention are not very powerful in their effect, but when conjoined to bleeding or other evacuations, they have some share in rendering nature unable to resist the action of the contagion. They may consequently be granted to have contributed in some degree to that remarkable loss of the cattle which has attended the attempts to cure the murrain.

the beasts, render them more subject to the malignant action of the contagion, according to the principles above laid down.

'The Peruvian bark, strong fermented liquors, cordials, and other medicines which have the same tendency to invigorate, and are thence, as will be shown below, agreeable to the true indication of cure, have, amongst the rest, been tried by some few physicians in their treatment of this disease. But the manner in which they were used, either with respect to the period of the distemper when they were given, the want of due perseverance in the exhibition, the joining to them injurious practices, or some other circumstance, has been such that few instances of good can be shown to have resulted from them, though enough to confirm what may be deduced from just principles of physiology respecting this disease, as to their utility in the cure of it.

'Bleeding has been practised by most who have attempted to cure the murrain. Many have done it promiscuously, in every period of the disease; others have confined it to the first stage only. Whoever considers the effects of bleeding on the habit and the nature of the distemper, as deduced from the symptoms, cannot doubt but that this evacuation must have largely contributed to augment the extraordinary number of those beasts which have died when subjected to medicinal treatment, compared to that of those which have been left to the favour of nature. The failure of that degree of animal strength in some beasts which is found in others is, as we evidently see from the facts above-mentioned, not only the cause why one part of the cattle takes the infection while another escapes it, but also, why it proves mortal to one part of those seized with it while the other recovers. Now it must be allowed that bleeding, when to such degree as to have any effect, more than almost any other means, diminishes the animal strength, or the force of circulation. Must it not, then, in proportion, conduce to bring the strong cattle to that state of weakness which is the cause, as we have seen above, why the disease prevails over nature in some more than others, and to render still more weak those which were so?

'It is not to be wondered at, nevertheless, that physicians who have hastily considered the murrain as an inflammatory disease[1] should adopt

[1] The notion that the murrain is an inflammatory disease, has arisen from the hasty conclusion of physicians of its being similar and having a great affinity to the small-pox and plague. But it will be manifest, from moderate observations on the respective symptoms of them, that there is no such similarity or affinity betwixt them in nature. The small-pox always produces general inflammation, and consequently signs of a strong fever in a greater or less degree in the first stage, and the excess of that inflammation is frequently the cause of its proving mortal. The same is seen in the plague, which begins with symptoms of strong fever and inflammation.

this most effectual means of resisting inflammation, but there is not the least ground for this notion of the nature of the disease.

'In the first stage the contrary of general inflammation appears, for then the symptoms exhibit signs of languor and a disposition to insensibility. Nor is there any general inflammation seen in the whole course of the disease, except when deposits of the morbid matter are made in the last stage, which, if they prove eruptions or tumours in the external parts, are a salutary crisis that should not, on any account, be disturbed or checked, or, if they fall on the internal parts, are a fatal symptom not to be resisted, and are then, moreover, attended with such a state of weakness in the beast that any considerable evacuation must soon be followed with a mortal sinking. At what time, therefore, is the bleeding to be practised with a view to the relieving against the inflammation? In the first stage, when there is a total absence of any such inflammation and the whole danger of mischief lies in that of the want of sufficient strength, or in the last stage, when there is such a state of weakness that the evacuation must necessarily kill the beast; or such a critical eruption as, if suffered to take its course, may save the animal, but if checked or thrown in by the diminution of the fever, which supports it, must attack the internal parts and either cause instant suffocation or convulsions, or, in a short time, a mortification of those parts?[1] In

Whence they may both be properly deemed inflammatory disorders, as inflammation is one principal secondary cause of the dangerous symptoms and mortality attending them. But in the murrain no such inflammation ever appears in the first stage, but the very contrary; nor does any great degree of heat occur till either towards the middle of the second stage, and then only in the case of a disposition to eruptions, when, as Dr Layard has justly remarked, it is a prognostic of a recovery, or at the end of the second stage, when deposits of the morbid matter are made on the viscera and soon induce a mortification. In the small-pox, an eruption is the sole salutary crisis which nature has instituted, and through which the subject can be saved. It is therefore, together with the preceding and attending inflammation and fever, essential to the disease. But, on the contrary, in the murrain, though eruptions are one mode of the crisis of the disease, or in other words, one way by which nature discharges the morbid matter when of due maturity, yet they are often wholly wanting, even when the beasts recover, and, therefore, not essential to the disease, even where it has its full natural progress. For in the United Provinces, and other moist and low countries, eruptions are most frequently not found in the beasts which do well, but a diarrhœa, or looseness, constitutes the critical discharge, and, in such case, no great degree of heat arises in the whole course of the disease. This proves an entire diversity in the nature of the diseases to be betwixt the small-pox and the murrain, and evinces that the indications of cure which are adopted from a supposed analogy of them stand on a very erroneous foundation.

[1] Dr Layard, who, on the whole, has written the most sensibly on this disease, says, 'Bleeding, therefore, will be found necessary only when the inflammation

every light, this evacuation appears to be injurious in the murrain. For if there can be a case supposed where it might tend to relieve against a

is so considerable and the fever so high that nature is obstructed and cannot expel the morbid matter, and, whenever such symptoms are apprehended, prudence will require bleeding to prevent this coming on, according to the constitution, strength, or age of the beast.' But I must dissent from the doctor as to his opinion that there are any cases which admit of a rule to be laid down for bleeding the cattle in the murrain. That *inflammation* does ever *obstruct nature so that she cannot expel the morbid matter* is a mere hypothesis, and, perhaps, might easily be shown to be such, as it is not consistent with the known principles of physiology; I shall, however, waive any discussion of that kind here. It is sufficient to deny that any such inflammation is found in the course of this disease, as no strong signs of any appear but the shivering and heat in the earlier part of the second stage, which denote an eruption, and are, as above-mentioned, enumerated by the doctor himself among the prognostics of recovery; or the violent fever, which follows the attack of the disease on the viscera in the very last period, and is, consequently, always a fatal symptom. But admitting there were cases when it might be beneficial to bleed the beasts in this distemper, with a view to prevent the coming on of too much inflammation, or the consequences of it when subsisting, how are they to be certainly distinguished in practice? Few physicians would agree with each other in settling precise diagnostic marks of this indication. How then are untaught owners of cattle, on whom the task of judging on this matter must depend in the general execution of it, to determine on a point of so complex and nice a nature? On what, according to Doctor Layard's intimation, is to be grounded *the apprehension of the symptoms when prudence will require bleeding to prevent this coming on?* Some answer to that difficulty is, indeed, given in another passage of his essay below, page 65, where he declares, 'If a beast be full-grown and fleshy, if a cow big with calf and of such colour as denotes strong fibres, then take away two quarts of blood from the neck. From a strong yearling calf, one quart: and so on in proportion to age and strength, but neither weakly nor poor thin cows, especially white ones, are to be bled so much, if at all.' But in the third chapter, where he treats of the prognostics, he enumerates these circumstances among the marks by which it may be discerned what beasts are least in danger of being attacked by the contagion and suffering violently from it, all which marks are, in fact, the appearance of strength, though he has not directly said so. Now, if strength be the preservative from the contagion and its effects, what is the consequence of bleeding those which bear such marks but, in fact, reducing them to the same state with the others which want this strength, or, in other words, rendering them equally unable to resist the effects of the contagion? Is not this setting up of art founded on vague principles for the sake of accommodating practice to the notions and hypotheses of darling writers, in opposition to the clear dictates of reason suggested by observation on facts. In chapter the eighth, speaking of the means to prevent infection, he is led round again to truth by the force of such observation. For there he very justly acknowledges the real fact that 'Bleeding and purging the cattle, so far from being of use, has not prevented the disease, but rather the symptoms have been more violent in some who were bled and purged.' The reason is obvious; because, being weakened, the beasts were less able to resist the contagion. But has the bleeding less effect in weakening the subject when performed after the infection has taken place than it had before? Surely it has not. This was delivered candidly from observ-

particular symptom, which is only when some internal part is inflamed by the deposit of the matter, yet such case would be desperate, and the evacuation would, in other respects, promote those effects that lead to fatal consequences. Bleeding for prevention of the infection, though not enumerated in the preceding view of the means used for that end, has yet been recommended by some physicians, and frequently practised. But on the same principle, of exposing the beasts to the force of the disease by weakening them, it is of the same bad tendency as when used for the cure. Indeed, it does not in this case so generally do harm. For when it happens not to be performed nearly at the time of the beast's taking the infection, the cattle, except those which are naturally weak, recover their strength again, and the evacuation has, therefore, no consequence with regard to the distemper.

'Purging has been frequently tried as a remedy against the murrain, in all the periods of the disease. There is evidently the same objection to it as has made above to bleeding, since it undoubtedly conduces to weaken and exhaust the beast, and, consequently, to render nature less able to resist the force of the contagion. It is also from other reasons improper in this disease by whichever of the two courses, a diarrhœa or eruptions, nature seeks to produce a critical discharge of the morbid matter. Where there is a tendency to eruptions, as for the most part is found in England, this evacuation would necessarily make a derivation and endanger the stopping its progress; and, indeed, not only with us but in Italy, according to Lancisi, "A looseness is an unfavourable symptom and denotes the weakness of the subject." In Holland it is frequent, and the cattle do recover with it. But where there is a disposition to it, or it is already begun, medicines which promote the same evacuation are certainly not proper, as they either bring it on before the due time or increase it, if already come on, to a degree that is beyond what the strength of the beast can bear. This, though not, perhaps, in every instance, must yet be the case in the greatest part. The most judicious observers agree, moreover, in condemning the use of purges in this disease, from an actual experience of their bad effects, and the adopting it has been certainly one source of the ill success which has resulted in the attempts made to cure the murrain.

'Blisters have been also tried in this disease, but not in so extensive a manner as to afford the means of determining how far they may be of

ation on the real phenomena. What we have before quoted was the result of theoretic reasonings founded on presumed principles, and the supposed authority of Sydenham, &c., in points where in reality no just analogy subsisted. Professor Camper wholly disapproves of bleeding in this disease from an extensive observation of its effects.

any avail in it. By the apparent tendency to a paralytic state, which is shown in the first period of the murrain, there is room to conclude that such a stimulus might come within the intention of cure. But whether it would be adequate to the indications, or trivial in its effects, can only be known from a large basis of observations. At all adventures, the difficulty attending the application of blisters to the diseased cattle by such persons as must have the treatment of them in general, renders their use a very unfit means of relief in the murrain.

'Rowels, setons, pegging, and caustics have been in their turn vainly employed in the murrain. It must be admitted, nevertheless, that nature sometimes throws the morbid matter on a part already diseased by a wound so made, and in that case renders it the means of a critical discharge, as we see happen in other contagions. But this will rarely be the case, and where it may there is always a sufficient degree of strength to produce an eruption, which would answer the same end. In any other circumstances, the discharge from these drains can be of no service towards the cure of the murrain. For they must know very little of physiology and the history of diseases, who imagine a purulent discharge can be of any consequence in them, unless at the due period it be converted into a critical one by a deposit of the morbid matter on the part. In all other views this kind of evacuation rather impedes than promotes the cure of the murrain, as it tends to weaken and exhaust the subject, and consequently to promote the prevalence of the contagion over nature.

'Mundification, performed by extraordinary cleansings and rubbing the skin of the beasts, has had great stress laid upon it by some who have undertaken the cure of the murrain. But it is admitted by Professor Camper and others, who have seen it much practised, to be of no avail. Indeed, the effects must be too minute to have any material consequence in a disease of so violent a nature, and if such laborious and constant cleansings, rubbings, &c., as are recommended were serviceable, the performing them would be impracticable where there are a great number of cattle infected, without more trouble or expense than the chance of benefit from them would countervail.

'The inefficiency of the above-enumerated various supposed remedies for the murrain are less to be regretted, because a great part of them would be attended with such expense and trouble as would render the general use inexpedient. And indeed the same may be said of all of them according to the manner they have been prescribed by those who have recommended them, in which several always, and for the most part many of them, have been combined together. Whatever method of cure is proposed to be actually serviceable in this disease, it must be practicable,

with a moderate share of expense and trouble, or it will never be put in practice by the proprietors of cattle so generally as to save a sufficient number of them to be of any moment to the public. Very little regard has, nevertheless, been had to this consideration by the physicians who have taken in hand the discovering means of relief against the murrain. They seem only to have sought after what might be efficacious in nature, and directed the use of what they thought so without calculating in the least whether the consequence of its use could be lucratively of any benefit to the private persons who might adopt it, or reflecting, that if it were of no benefit to them they would not adopt it, nor the public therefore reap any advantage from it. Even the most able of those who have been engaged in this pursuit, have seemed to forget wholly this circumstance, which is indispensably requisite to the forming an effectual plan for the saving any material number of the cattle, as it would be more profitable to abandon them to the effect of the disease than to incur a greater expense in attempting it than is balanced by the value of the chance of saving them.[1]

[1] In calculating the advantage that is to be received from any remedy for the murrain, the expense incurred by the use of it for the number of beasts actually saved must not be considered alone, but that of all those with which it has been used, in order to the saving such number, must be included likewise. In order, therefore, to determine the value of the chance of saving the cattle by any means of remedy comparatively with the cost of such means, it is proper to state the circumstances in this manner:—It appears that at present in Holland somewhat less than half the beasts which take the infection recover without the aid of any medicinal assistance, and in our country, where, as we have before observed, the beasts are stronger, we may safely reckon at least that proportion. But as it is impracticable, when the signs of the distemper first appear, to distinguish with any certainty those beasts which would die without aid, it is necessary all those that are seized with the disease should be subjected to the curative treatment. Let us further, in order to bring the whole matter into this point of view, suppose a method proposed that would save one-half of the beasts which would die without the aid of it. It will then result from these premises that, on the whole, to save one beast the expense of the medicinal treatment must be incurred on four, as one-half would recover if they were left to nature, and only one-half of the other is to be saved by the medicinal aid. For a method which could effect that must be justly deemed highly efficacious. In the methods which have been recommended, and particularly that by the latest and best writer on this subject in our own country, the expenses of labour, medicaments, the extraordinary diet would amount in the treatment of each beast to at least one pound five shillings, and, according to some prescriptions, they would rise to double that sum; so that in any of these methods, according to the manner of computing here laid down, the saving each beast would cost at least five pounds, and in some of them ten. This great expense would not only take away all inducements in the view of gain from the owners of the beasts to employ such means for saving them, but the greatest part of such owners would not be able to make the disbursements necessary to it in proportion to their stock

'The knowledge of the symptoms, which are easily discernible and best distinguish the murrain from other disorders incident to cattle, and of the peculiar appearances that are produced in the inward parts of beasts which die of it, make by far the most important object of the communication of what regards this disease. It is extremely requisite that all owners of cattle should have a moderate acquaintance with these matters, in order they may as soon, and as certainly as possible, be able to inform themselves whenever their cattle appear to be out of order or die in a suspicious manner, whether they be infected with this disease or not. Without such means of judging, they may either inadvertently suffer the contagion to spread in their own herds or to those of others, if it happens to be introduced to any of their beasts, or otherwise be led, from a mistake of other distempers for it, to be at great expense and trouble in trying to prevent it when there is no real occasion. It is of equal consequence, both with respect to the public and to themselves, that a certain degree of intelligence of the criterions by which the murrain may be known from other disorders should be possessed by magistrates, constables, parish-officers, and inspectors of cattle, particularly those near sea-ports, that they may, in some measure, be enabled to put the Acts of Parliament and Orders of Council concerning the disease into execution; as those Acts lay a task upon them, should the occasion of their being enforced present itself, of a very nice and complex, as well as momentous nature. I shall, therefore, first give an enumeration of those symptoms of cattle diseased with the murrain, and a description of those appearances it causes in the inward parts of the bodies of beasts that die of it, which are so simple and strong that they may be readily perceived and distinguished by any persons, however little versed in the observation of diseases or other subjects of medical concern. I shall afterwards, for the use of others who may choose to carry their speculations further and attempt the study or cure of the disease, point out those more latent and less perceptible symptoms and effects of it, which require a previous knowledge of physiology to their being properly observed, and which are rather useful for investigating the nature and kind of the disease, and the best method of curative treatment of it, than for distinguishing it, by sensible marks, from other disorders of cattle. I shall proceed also to apply the whole to that purpose of examination, and to explain whatever can be at present collected of the physiological principles of the disease, in order to as-

of cattle. As the whole must be provided and laid out in a short space of time, it would therefore be more to their interest to submit to the present loss and recruit their stock by future resources.

certain thence the best means of prevention of the contagion, and the proper intention of cure to be adopted in the medicinal treatment of such as are already infected.

'The first apparent symptoms of the murrain are: a dry cough; a shivering and gnashing of the teeth coming on at considerable distances of time; shaking the ears and hanging down of the head as if from weakness; stretching out of the neck as when there is a difficulty of swallowing; moving often slowly from place to place seemingly in a constant state of uneasiness; decrease of appetite; diminution or, on the fourth day, total loss of milk in cows which are in a milch state, attended with a lankness of the belly and udder;[1] and sometimes costiveness. During the time these symptoms only appear, the cattle will eat, chew the cud, and at some times look brisk and lively; but after the third or fourth days, the following symptoms come on gradually but quickly, except in those beasts which have the disease in a very mild and gentle manner:—A constant heaviness and stupidity; a general weakness; a great decline of the appetite and chewing the cud; a frequent trembling of the whole skin, or of particular parts of it, especially about the flank and buttocks; a purging in some, or a discharge from the nose and ears; and a total loss of the milk in milch cows, if it has not come on before.

'Where the disease is not slight, the above-specified symptoms are soon succeeded by these others:—A refusal of all food, and ceasing entirely to chew the cud; an increase of purging; the excrement becoming of a very yellow or of a dark green colour, stinking, and, in some cases, coming away of itself from the fundament, which seems continually open and moving; a difficulty and shortness of breathing, accompanied with groaning, and an extraordinary distention and widening of the nostrils; a scabbiness of the nose and lips; a great swelling

[1] Doctor de Monchy, city physician to Rotterdam, in his 'Remarks on the Mortality among the Horned Cattle,' mentions a decrease of milk and a lankness of the belly in milch cows, and a drowsiness and cough in young beasts, as sufficient signs to discover this disease in the cattle. But though they may be good reasons for suspicion of it in places where the contagion is already in the neighbourhood, yet they are by no means alone just grounds to determine that cattle so affected are seized with the murrain when there is no likelihood of the infection having been conveyed to them. The decrease, or even loss, of milk in cows, and the consequential lankness of the belly, are attendant on any considerable feverish disorder, and the drowsiness and cough in young beasts may arise from colds or other epidemic disorders. I have mentioned this, because Doctor de Monchy's dissertation has lately been translated into English, and such a passage in it may mislead and occasion false alarms respecting the introduction of the contagion into our country.

of the belly; a restlessness, uneasiness on lying down, and defect of power, through weakness, to stand, whence the legs are extended outwards, as it were, to prop the body; eruptions on various parts of the body, but particularly about the flank and udder; miscarriage in pregnant cows; and, where the beasts are strong, hard tumours, like boils, especially along the back on each side the bone felt under the *panniculus carnosus*, or outward skin, which frequently break and discharge matter very fetid or stinking.

'These symptoms go on, most of them augmenting, till the turn or crisis of the disease. They then begin to decrease, and some degree of appetite and chewing the cud to return, if the beasts recover. If otherwise, the purging becomes greater, or, if there were none before, begins with violence, and the dung passes off involuntarily, not only the anus but the tail seeming to lose all power of action. The eruptions, if there be any, flatten; or the tumours, like boils, under the skin grow soft; and the strength seeming to be spent, the beast dies suddenly without any other previous signs; or, in some cases, is violently convulsed, roars loudly, throws out a large quantity of foam or froth from the mouth, struggles hard, and tosses about the head with great force.

'The second stage of the disease is seldom continued longer here than three or four days, reckoning it, as above-mentioned, from the fourth day after the first signs of the infection. So that the general period of the distemper, from the first attack which was perceived to the crisis or turn, according to the course of the distemper as it subsisted here, may be accounted about seven or eight days.[1]

'The time of appearance of the first signs, after the infection is received, is five or six days, rarely more, unless where the slightness of the disease renders the symptoms so gentle that they do not become perceptible till in an advanced period of it; but this cannot carry it beyond the ninth or tenth day.

'It is not to be understood, nevertheless, that in every beast which has the murrain, all the above-enumerated appearances will be found. For as different parts are affected in different subjects, the symptoms

[1] In Holland, the period of the murrain from the first sensible marks of it to the crisis or turn, is much longer than it appeared to be with us, and is most generally found to be about twelve days. The reason of the variation of the disease in this point betwixt Holland and here, lies in the superior strength of our cattle, which enables nature in them to bring the disease to a crisis in so much less time. This greater degree of strength in our cattle manifests itself, as we have remarked elsewhere, in their more frequently throwing out eruptions in this disorder here than in Holland, and in their not being susceptible of the infection, except after very bad seasons, though less injurious epidemic causes render them so in that country.

vary accordingly, particularly in the last stage; and the natural or casual habit of the beast, as to strength, age, and pregnancy, makes likewise a considerable alteration, both as to the kind and the degree of the effects of the contagion. The symptoms of the first stage, except the costiveness, constantly attend, however, in a greater or less degree; and the greatest part of those of the second stage follow in a more or less violent manner. The discharge from the nose and eyes is very general; and scarcely ever wanting in those beasts which recover. The purging and swelling of the belly are also very frequent; and almost always occur in those beasts which die. The eruptions and hard swellings like boils are likewise very common here [1] in those which recover.

'On the whole, therefore, by a due observation of the manner in which beasts seem affected, when several are seized with an unknown disease at nearly the same time and place, it may be determined, on very good grounds, when the contagion has been introduced. The hanging down of the head and stretching out of the neck, with other signs of weakness, coming on in the first stage; and followed by the insensibility, tremblings, eruptions in the flank and udder, or hard swellings like boils along the back, and breaking out or scabbiness about the nose and lips, in the second stage; may be looked upon as peculiar symptoms which characterize the disease, and leave little room to doubt of its presence where they appear.

'In order, nevertheless, to obtain a more positive certainty in any case where there is reason to apprehend, from beasts having died in the manner and with the symptoms above described, that the infection has been brought to any place, it may be further proper to examine the carcases of such beasts by opening them; and if it be as supposed, the following appearances, or most of them, will present themselves. This examination must, however, be confined to such as die from the natural course of the distemper; and not extended to such as are killed, or have been subjected to medicinal treatment; because the disease has not

[1] Though eruptions were very frequent in the murrain while it prevailed here, yet they are much less common, as has been above intimated, in Holland, and other low and damp countries, where the cattle are habitually weaker. When they do appear there, they are also different, for the most part, from those found in our cattle. For instead of being on the back, and large like other boils, they are generally about the flank and udder; and are less, flatter, and softer. The general crisis of the disease, in such case, is not by eruption, but by diarrhœa or looseness, which was found here, on the contrary, to be mostly a bad symptom. This is not, however, constant. For there are instances of beasts which do well in Holland without a diarrhœa; and there were some here of those which recovered with it. But the crisis, nevertheless, is here by far the most frequently an eruption, either on the back or about the nose and lips; and in those countries a diarrhœa.

then had its due and full effect on the parts; and the state in which they will then be must proportionably fail to answer the description above given.

'A very stinking air, and sometimes matter, rushes out on piercing the skin, or making an opening into the cavity of the belly; particularly if there be swellings on the back, and the skin be pricked or cut in that part. The mouth, throat, and gullet are red; and full of small specks, or ulcers, attended with the appearance of what is called the *thrush* in children. The lungs are red, ulcerated, speckled with blackish spots, and sometimes fraught with small bladders of fluid-like water. The liver is swollen, full of dark yellow gall, and rotten, so as scarcely to bear the touch; and the gall-bladder is stretched to a large size by greenish gall. The cud-bag, or paunch, is red and discoloured with blackish spots, puffed up with air to a very great magnitude, and void of any fluid, but containing a hard mass of cud, which has remained there and is become dry, instead of passing to the other intestines to be digested. The honey-comb, manifold, and curd-bag are in much the same state with the cud-bag, except as to the various degrees of hardness and dryness of the cud in the two first, and that the curd-bag is empty. The smaller guts are spotted with red and black; and the end of the rectum or last gut, for some space above the anus or fundament, is black, rotten, and foul with clotted blood on its surface. The womb is red and enlarged in cows that are not pregnant, but in those with calf it is blackish. The fat, where any can be found, is of a high yellow colour and soft consistence. Collections or gatherings of matter are frequently met with in the cavities of the horns and head. When the greatest part of these appearances present themselves in the respective parts on opening the beasts which have died after the principal of the above symptoms have been observed in them, there can be no room to doubt but that they have had the murrain. Even where any accurate information may be wanting of the nature of their illness, there is a very strong ground of conclusion that it was this disease, if, on the examination of the carcases soon after the beasts are dead, the eruptions, particularly the hard boils along the back, the scabbiness on the nose and barbs, the puffing up of the skin or belly with stinking air, the gathering of matter in the horns and head, the dry mass in the cud-bag, the blackness of the womb, and the rottenness of the gut next the fundament, or most of them, are found.

'The symptoms and effects of the murrain, which may be deemed, less properly than the foregoing, the subject of the examination of persons not conversant in medicinal subjects, and less apparently the characteristic marks of the disease, but which may yet afford material lights

for discovering the true nature and the indications of cure of it, are those which follow.

'In the first stage, heat, but not great, in the head, and particularly at the roots of the horns, attended with a coolness of the body and the extremities; hot and stinking breath; deafness; pulse quicker than in health, the strokes being from sixty to seventy, but irregular, though without stated remissions.

'In the second stage, signs of sickness:[1] breath more hot and stinking; fetid steams from the skin; respiration difficult, particularly expiration laboured and performed with groaning; urine high-coloured and turbid, but generally without any deposit of sediment, or any bad smell, and retained longer than in health, though not in the whole much different in quantity; dung acrimonious or sharp to such a degree as to leave a visible irritation for some time after in the anus; blood florid; seeming exacerbations of pain in the evening; a constant disposition to lie, but attended with such uneasiness in some that they stand almost continually, though with great difficulty on account of their weakness; an absence of thirst throughout the whole disorder, though with a willingness to drink in moderation; pulse increasing in quickness, according to the progress of the disease, from seventy to ninety, and having periodical diurnal remissions as in the paroxysms of fevers, but irregular, intermitting, and growing smaller as the velocity becomes greater.

'On opening the carcases of beasts dead of the murrain, these appearances will occur, together with those before enumerated:—In the brain, the blood-vessels are found turgid and very red, and clots of

[1] Doctor Layard has mentioned, along with the sickness, the throwing up of bile as one of the symptoms of the murrain. He does not intimate that he has seen it himself, but refers for it, in a note, to Aretæus 'De Morbis Acutis.' The notion of such a fact was a most palpable error in the first broacher of it, whoever he were; and it is a great inadvertence in the Doctor to adopt it; as he has himself, in more than one part of his treatise, insisted on the impossibility of neat cattle vomiting at all, on account of the formation of their intestines. Professor Camper has, indeed, seemed to contradict this opinion by the relation of a fact. For he declares that giving a decoction of camomile has made the beasts vomit. If that did happen, however, it cannot be supposed to be any other vomiting than the returning the fluid into the mouth from the cud-bag only, by the same action as the cud is brought back thither in order to rumination; which could have no effect towards forcing up bile. Whoever considers that the bile must pass through all the four stomachs in its way from the duodenum to the mouth, must be satisfied that it is next to an impossibility any such thing should happen. It is most rational to believe that if a discharge from the mouth of anything resembling bile, on a slight inspection, has been observed, it was only of some yellow cud mixed with a large proportion of fluid, and mistaken for bile in default of stricter examination.

grumous blood, as well as a lymphous fluid, show themselves frequently in the substance. On the membranes of the cavities of the nose, and the whole extent of the frontal sinus, the large glands, and the medullary substance of the horns, marks of inflammation and excoriation will be seen. The kidneys and bladder are inflamed and void of urine. The flesh in some beasts is livid, in others of a lively red for a short time after the death of the beasts, but soon changing to a green colour. Appearances are found of emphysema, or vesicles of air, in the lungs, mesentery, and cutaneous membranes in various parts of the body.

'From the whole of the symptoms and appearances of the murrain, we may draw these conclusions as to the nature and effects of the disease:—It is communicated from one beast to another by a contagious matter or virus, that, acting as a leaven, produces a ferment in the humours of the parts into which it is introduced, and either reduces the nerves of such parts to a paralytic or inactive state, or renders them too irritable and active, at the same time counteracting those natural ferments in such humours which are requisite for the due support of the animal economy. But when, from the strength of the solids giving due motion to the fluids, the natural ferments are duly powerful, it cannot prevail over them, and therefore has no morbid effect, as we see in those beasts which escape the infection, though exposed to the contagion. In those subjects where there is a default of such strength, it goes on by the above-specified means to weaken the force of the circulation and deprave the secretions; whence also that putrescence or putrid ferment to which all animal substances have a natural tendency, when not superseded by the vital ferments, is at length brought on, and if no critical expulsion be made in due time of the contagious leaven by the fever induced by its effects, destroys the vital economy, and necessarily causes the death of the beast. But if, by the inflammation produced, the force of circulation, and consequently the power of the vital ferment, be so increased as to overcome that of the contagious leaven, the morbid matter in which it resides is expelled, either in eruptions on the surface or by a discharge from the intestines.

'The progress and the manner of the action of the contagious virus in the murrain may, from the symptoms and the appearances in the dead beasts, be deduced to be as follows:—The first effects of the contagion appear principally in the head and the upper parts. It produces a certain degree of nervous weakness or paralytic disorder in those parts, as is shown by the deafness, dulness of the eyes, debility of the neck, and shaking of the head. This disorder affects also gradually the glands which secrete the saliva and lymph of the stomach, as there is found, in a more advanced stage of this disease, a total want of those

fluids, the cud forming a dry concreted mass. At the same time, nevertheless, the glands of the nose and eyes are rendered more irritable, and the humours are secreted in them much more copiously than the natural degree. The paralytic disorder of the salival glands, and the glands of the stomachs, extends itself frequently in the first stage to those of the small guts, as may be inferred from the costiveness observed at that time. But this often changes afterwards into a great irritability in the second stage, as is evinced by the profuse diarrhœa attending. On the other hand, the irritability of the glands of the nose and eyes seems to be continued to the membranes of the lungs by the cough, which is almost a constant symptom. The stomachs seem also to partake of the paralysis of the upper parts, and this appears to be in proportion to their nearer situation to those parts, as may be inferred from the retention of the cud in the cud-bag and honey-comb, and the emptiness of the cud-bag. There is an early effort of nature to make an expulsion of the morbid matter by the external parts of the head, as may be collected from the signs of topical inflammation which show themselves, and particularly about the horns, where abscesses are afterwards frequently formed. But this alone rarely proves a critical discharge.

'After the first four days the contagion diffuses its effects much more generally, and frequently attacks the liver and the lower intestines, which then become very irritable; a great discharge of bile, and the other humours secreted in them, ensuing. But the inactive or paralytic state of the salival glands and those of the stomach yet goes on increasing, till all secretion by them ceases. Hence the appetite and digestion are entirely lost; and the inanition, caused by the want of a due supply of chyle to the blood, conspires greatly, with the nervous debility above specified, to bring on a great languor of the circulation and other vital action. This necessarily induces a putrescence of the juices; whence new sensible effects are produced, which may be deemed secondary symptoms; being not the immediate consequences of the action of the contagion, but the effects of the putrid ferment suffered to prevail by the suppression of the animal ferments, which counteracted it while they subsisted in the due degree. In this difference of the cause of the symptoms, principally consists the difference of the first and second stages of the disease; the first exhibiting those alone which result from the action of the contagion on particular parts, and may, therefore, be called primary; the second displaying not only a further extension of such symptoms, but those others also that are caused by the general depravity of the fluids, and the consequential disorder of the vital economy, which arise from the putrescence that prevails from the weak

action of the solids in giving due motion to the fluids, and from the defect or perversion of the glandular secretions. In this advanced state of the disease a final period is soon brought on, either by a salutary crisis or the death of the beast. The morbid matter falling on some particular parts, and the general depravity of the humour causing obstructions in others, topical inflammations and a general irritation follow; whence, necessarily, a fever rises in a greater or less degree. By this means the force of the circulation is increased, so that, where the habit is strong, the natural ferments, being again revived by the accelerated motion of the fluids, prevail over that of the leaven of the contagion; and the morbid matter is either thrown on the superficial parts, in case of great strength, where it forms eruptions and tumours; or discharged by the glands of the intestines, in case of a less degree of strength. This constitutes a salutary crisis, in consequence of which the beasts recover from the murrain, at least considered as an acute disease; though they sometimes die afterwards of the ulcerations or abscesses produced then by it in the brain, lungs, or other viscera. But if the natural strength be so defective that the irritation and consequential fever cannot produce a sufficient force of circulation to give due power to the vital ferments, the contagious leaven and putrescence overcome them; and an excessive evacuation is made by the liver and the glands of the small guts, which exhausts the remains of that power on which animal action depends; while the external and weaker parts suffer a gangrene from the deposit of the morbid matter, and the want of due motion of the vitiated and putrid humours.

'This investigation of the progress and manner of action of the contagion, according to the state of the subject in the murrain, affords a clear view of the indications of cure. It is evident that the struggle here betwixt health and the disease lies, in fact, at first, betwixt the vital ferments which support the animal economy and a preternatural ferment which tends to destroy them; and that consequently, if the latter prevail, it introduces the putrid ferment to which all animal substances have a disposition when it is not controlled by the vital. It is certain, also, that the vital ferments depend on the due commixture of the several humours and their constituent parts by the circulative motion of the blood, and those other motions of the animal juices which are performed by nervous action, and that these motions are more or less strong in proportion to the nervous strength of the subject, or, in other words, that they are rendered vigorous or languid as that strength is augmented or diminished. Whatever, therefore, increases this nervous strength or gives tension to the fibres, increases those motions, and whatever adds to the force of those motions proportionately

increases the vital ferments, and consequently resists the action of the contagion, which cannot take place while they maintain themselves in their due power. Hence it follows that the way to assist nature against the attacks of this disease, is to keep up the animal strength by such invigorative means as are compatible in other respects with the salutary economy.[1]

'To invigorate and strengthen by the administration of such medicines as give force to the action of the nerves and tension to the fibres, is the principal absolute intention of cure, which is dictated by the general nature of the contagion and its mode of operation. But there is, moreover, a palliative or secondary intention, which arises from the consideration of a peculiar symptom. It appears from what is above laid down, that the state of the parts subservient to digestion denies the performance of that office on such food as requires the aid of saliva and of lymphous juices secreted in the stomach, whence the power of the contagion is increased by the weakness resulting from the inanition, and the depravity of the humours in consequence of the want of a supply of fresh chyle to the blood. It is, therefore, a just subservient intention to furnish a proper quantity of such food, of a fluid consistence or divided texture, as can be digested under these circumstances, and thence to support the strength of the subject, which must, otherwise, sink from the concurrence of this additional cause of weakness with the effects of the contagion and putrescence.

'The primary intention of cure in the murrain, according to these principles, is to be executed by the administration of such corroborative and cordial medicines as give due tension to the fibres and vigour to the nerves, removing the spasmodic insensibility or impediments to their action, or their too great irritability, whence an irregular mode of action is produced.

'There are various kinds of medicaments which have these powers. But experience in the case of similar diseases, and the consideration of general fitness to the peculiar circumstances of this, point out two species, which are more peculiarly proper as well as efficacious. These medicaments are the astringent, febrifuge, gummous parts of vegetables, and vinous liquors.

[1] The same intention of cure, as is here proposed for the murrain, is now pursued by all able physicians in the contagious and other diseases of mankind that induce a putrescence, experience having shown that it is the only means which avail in such cases. It is, therefore, demonstrated to be the proper method of treatment of cattle in the murrain, not only by reasons deduced from the symptoms of the disease and the observations of the cause why amongst the cattle left to nature some escape and others are carried off, but also from analogy on comparison with the facts respecting similar diseases.

'It is found that various vegetable substances containing the astringent gums, and bitter juices, which possess the property of tanning leather, have the quality of bracing the fibres in the living animal, assisting to the due tone of the nerves, and thence checking the putrescence which would otherwise prevail in consequence of a certain degree of weakness.

'The Peruvian bark is the principal simple of this kind which has been hitherto used, and experience has not yet evinced any other to be in all respects an equal substitute for it. The efficacy of this drug in intermitting fevers has been long known, and, more lately, its utility in some contagious disorders, and all others where the weakness and relaxation of the fibres aggravate the effects, is equally ascertained. Nor are there wanting sufficient trials, as was above intimated, to show that, what might be well presumed from analogy, holds good in observation on facts, as to its availing in like manner in the murrain, though it has never, as far as appears from any reports made to the public, been used with those advantages as to the collateral circumstances which would most have contributed to render it effectual.

'There is, nevertheless, a great obstacle to the giving the Peruvian bark alone to the cattle in such quantities as might be requisite in the murrain. This is the high price of it, which would render the administering it, for the time and in the quantities necessary, a considerable expense; and it is absolutely requisite to the using any remedies in this disease with benefit to the proprietors of the cattle, that their cost on the whole should be moderate. It has, therefore, with great reason, been thought expedient to spare a part of the bark, and substitute for such part some other cheaper simple more allied to it in its properties. The white willow bark has been selected by some for this purpose, and has, indeed, the tanning property in a considerable degree; but there are other simples which have that in a still greater, and also possess at the same time additional qualities which materially conduce to the invigorating effects. The tormentil root is peculiarly adapted to this intention, as it has not only the due astringency, but the warming and cordial properties of bitters and aromatics, whence it may check the profuse diarrhœa, which, when it comes in the early period of the disease, so frequently carries off the beasts by exhausting their strength before nature can perfect a mature crisis. This simple may, moreover, be easily obtained even at the slightest expense, being one of the most common and general of the herbs which grow wild in these parts of Europe. It may therefore be well substituted for at least one-half of the bark where no early purging comes on, and for three-parts in four where it does, as the quantity of it may then be increased with advantage. It may be proper, likewise, to add a proportion of some warm

aromatic simple of the kind called carminative, and the carroway seed is extremely well suited in all its qualities to that purpose. This will invigorate the action of the stomachs, which appears evidently languid, the stomachs themselves, as was above observed, participating in the paralysis of the upper parts.

'By vinous liquors, which are the other species of invigorating medicines proper in the murrain, is meant any kind of fermented liquors that contain vinous spirits. The late-acquired knowledge of the efficacy of this kind of remedy in contagious and other fevers where putrescence prevails, has furnished the means of aiding nature to resist such diseases when the natural strength could not otherwise support the vital economy against the effects of them. The giving wine in our country to the beasts in the murrain, would, however, be impracticable on account of the expense, and perhaps good fermented malt liquor is better adapted, on the whole, to the intention than wine. A proper quantity, therefore, of ale that is not too new, or of that kind of malt liquor called strong beer, should be given twice a day, and to render it more cordial where greater symptoms of weakness appear, a proportion of some distilled spirit should be added to it. The kind called geneva is the most cheap and easily obtained, and the ingredient, besides the vinous spirit, being terebinthinate essential oils, are by no means improper in this case.

'The secondary intention of cure above mentioned, by the supply of diet suitable to the disordered state of the digestive faculty in the murrain, may be thus provided for:—The beasts may be fed on hay, so long as it appears to agree with them. Though, as there is always a defect of the saliva, and the lymphous juices of the stomach, as well as a consequential weakness in the digestive ferment, it may be proper to mix some proportion of green herbage with the dry fodder. But when the hay or herbage cannot any longer be digested, as will be indicated by the beasts' refusal of it, and their ceasing to chew the cud, it will be requisite to have recourse to such other food, as is either fluid, and consequently does not demand the dilution of the saliva and lymph, or such as is of so divided a texture and so yielding to maceration, that it may not need the strong action of a digestive ferment to its resolution, or reduction to that state of chyme which fits it to pass into the smaller intestines. Milk is the most nutritive of any fluid which can be administered in this case, and, if its coagulation be prevented by the addition of alkalies to counteract any accidental acid in the other stomachs that might otherwise have that effect, it will of course pass forward to the curd-bag, which, from its emptiness in the dead beasts, appears not to have lost its action as the higher stomachs, but to pro-

pel duly the chyme or digesting matter into the lower guts. In order to make a saving in the quantity of the milk which, if used alone, would be considerable, it may be expedient to add some water and a proportion of solid food of the nature above prescribed. The most fit kind of such solid food is corn in a farinous state—that is, reduced to meal; which may be of any sort that is cheapest and most conveniently to be obtained. This will be macerated so as to mix with the fluid given with it if the digestive ferment be ever so weak, and will pass with it forward into the small guts, if the action of the stomachs be ever so slight. By these means proper alimentary matter will be conveyed into the lower intestines and there digested, as they and the curd-bag are not, at least in the earlier stages of the disease, so disordered and rendered incapable of their office as the three upper stomachs, the default of the action of which will, nevertheless, in this method, be made of much less consequence.

'The nutrition of the beasts in the latter stage of the murrain will be thus provided for, notwithstanding the impediments which the effects of that disease otherwise produce to digestion, and the inanition thence resulting, which conspires powerfully with the other causes of weakness and putrescence to render the disease fatal, will be, in a considerable degree, prevented.

'The alkalies, which may be used to hinder the coagulation of the milk given as food to beasts in the murrain, may be a small proportion of soap or chalk.[1] The latter of these may be used more copiously where a looseness comes on too early or too profusely, as it will check such an evacuation without the danger of stopping it in case it be critical.

'By a proper use of these medicines and regimen it may be presumed,

[1] The use of alkalies has been exploded by some eminent writers in all cases where a putrescent disposition prevails from the notion of their promoting it, and some of the most sensible of those who have treated of the murrain have adopted the same opinion. But this objection to alkalies is not justly founded, as they have not, when taken in moderate quantities, such an effect in the habit. The proportion of them given medicinally is far too small to have any immediate action of this kind on the whole mass of fluids, and in their consequence, from the operation they may have in the intestines, they produce often the contrary effect. For by destroying the acescent ferment which prevails in cases of weak and disordered digestion, they promote the proper digestive ferment, and prevent that increase of debility and general injury to the habit which the faulty digestion would produce. It may seem a paradox according to the effects of experiments made on the relative substances out of the body, but it is, nevertheless, absolutely true that alkalies check also the putrid ferment of the digesting matter in the intestines, as is plainly evinced by their removing almost constantly that species of heart-burn which arises from the putrescence of animal food in weak and depraved stomachs.

on the justest ground of trial and observation, as well as of speculative reasons, that a considerable number of the cattle, which would die of the murrain if left to the natural course of the disease, would be saved. It is not to be imagined, nevertheless, with the least shadow of reason, that there is any method of cure which would avail in every instance, the very weak or disordered habit of part of the beasts subjecting them to the violence of the distemper in a degree beyond the power of those practicable means that can support their strength. But if such a number be preserved from destruction as overbalances, on the whole, in any material proportion,[1] the expense of the treatment of the cattle by the method proposed, the proprietors will find an adequate inducement to put it in practice, and the public will in several different manners reap great advantage from it if extensively adopted.

'I have, for more than one reason, omitted, at present, the giving formal prescription for the medicines or rules for the regimen, as there will be a more proper season for it if the occasion for the practice of them should ever again occur in our country. The knowledge of the symptoms and appearances by which the disease may be distinguished are alone all that is necessary to be generally taught now, but that knowledge certainly ought to be diffused as universally as possible. The explaining at this time a method of medicinal treatment, in such a way

[1] On a modern computation, the treatment of a beast conformably to the means of cure above recommended would not, on an average, cost the owners of cattle above eight shillings in the course of the disease. So that if, according to the principles above premised, it were necessary to practise it on four beasts in order to save one, the actual expense incurred for each beast so saved would not amount to above thirty-two shillings, which is not more than one-third of the price of neat cattle, taken one with another, at a time when the disease prevails. But the advantage to the public would be in much greater proportion than merely this gain, from the effect the saving one-half the beasts that otherwise would die would have in keeping up the national stock, and preventing the scarcity from becoming greater, the mischiefs of which, when it goes beyond a certain degree, augments in much larger than an equal proportion to the scarcity itself. To the proprietors of cattle, moreover, the advantage of every beast so saved would be far beyond the common price of one in other respects equal. For after the disease has had some duration in any place the value of the cattle which have had it rises very considerably on account of their future security from the infection. In the latter part of the time when it last raged here a cow, which could be well certified to have had it, was deemed to be worth sixteen pounds, near London, and the same holds good now, as to the price of such a cow in Holland. This circumstance not only yields an additional motive to the proprietors of cattle to pursue an efficacious method of cure, but it is pregnant with great advantages to the community, as the recovered cows must here, where a fresh supply cannot be had by land, as on the Continent, make the principal dependance for breeding to keep up the stock and for obtaining milk.

as to render it easily practicable by the common owners of cattle, would be rather injurious than beneficial in its effects to the public. What constitutes the great object of care and attention at present is the excluding the contagion from our country by the immediate slaughter of the beasts infected or exposed to the hazard of being so, and not the attempt of cure.[1] Reason and the legislature both decree that measure; and in order that what is ordained by authority respecting this slaughter,

[1] As the means which ought to be pursued for the national security, according to the present circumstances, in case the murrain should break out anywhere with us again, are the killing immediately the cattle infected, and the preventing the removal of those exposed to be so, or of anything that can convey the contagion, the publishing at present directions for the cure of the cattle in so explicit and familiar a manner as might be easily put in practice by the common owners of them, would probably have injurious consequences to the public, as it might produce motives to neglect destroying the beasts under the hope of saving them by cure. It is, therefore, more proper while the disease is confined to one spot only, or to a few with narrow limits, to furnish every assistance to the quick and certain discovery of the disease if it should be brought over to us, in order to suppress it instantly by those means which are ordained by law, than to encourage any endeavours to save such beasts as are infested with it. If after these means of extirpating the contagion have been duly tried, they should be found to have failed of success, so that the infection has been spread over a large extent or diffused into a great number of places, as happened in the former invasion of our country by it, the case would be quite altered, and the supplying then as extensively as possible the best means of saving the cattle by medicinal aid, would be a great benefit to the public, because the destroying them under those circumstances would be very detrimental instead of advantageous, as it could not possibly produce the intended effect, but would co-operate with the disease itself in causing a scarcity of cattle. The continuance of the orders for destroying the cattle after the murrain was extensively spread over the country had a very apparent bad effect the last time it raged here. The visible constant decrease of the cattle as well from the number slaughtered as from those which died of the distemper, the great room which it was found the bounty offered at large gave for impositions and frauds, and the heavy expense on the public in providing for the bounty, afforded therefore the strongest reasons for retracting the orders for killing the cattle. This instance, as well as obvious deductions from the subject itself, evinces it is only when the murrain first breaks out, and the infection is confined to narrow bounds, that the means and regulations at present provisionally ordained by Act of Parliament can possibly avail and be proper. For afterwards the killing those beasts which might otherwise recover would be a palpable loss, not only of so many cattle, but of those that, as we have seen before, are, from their future security against the infection, of far greater value than others, and the restrictions with regard to the driving and removing the cattle, the prohibitions of fairs and markets for the sale of them, &c., would cause such a defect in the supply of the capital city as would be attended with very embarrassing and distressful circumstances. There is another reason why I have deferred giving a formal description for the medicinal treatment of the cattle. It is that though I am convinced from trial and observation the practice recommended is good in a general view, and I could point rules for the conducting the particulars

and the other regulations for the keeping out and stopping the progress of the infection, may be rendered more effectual, I shall here subjoin a few hints relative to some defects and errors in the present plan of measures which, as they now stand, may prevent its being effectual to the purpose.

'The first and greatest defect attending what is ordained by the Government for the suppressing the contagion of the murrain, in case it should be brought hither again, is the general want of due knowledge for discovering the disease early on its first breaking out, or distinguishing it with some degree of certainty in each particular beast from other disorders incident to cattle. It is in vain that private persons should be enjoined by the Government to destroy their cattle and magistrates to compel them to it, and return them a satisfaction, provisionally the infection be actually in the place, if they be wholly ignorant of any certain signs by which they can distinguish it. Yet this is almost universally the case at present, there being scarcely any but persons applying to medical speculations, and some few others, who may remember what they observed during the time of its prevailing here formerly, that are in the least acquainted with the nature of the disease or its appearance. Moreover, the far greatest part of those who may be desirous of acquiring a due information in this matter are almost entirely destitute of the means, as there is no method generally known of gaining any satisfactory intelligence relating to it; and such lights as might be obtained, if the means were better known, could not be procured occasionally in case of an alarm in any particular quarter before the opportunity of their being serviceable was over, and either the contagion, if it had been really brought, was propagated too widely to admit of a suppressive remedy or a needless expense incurred by the neighbourhood if any other disorder of the suspected beasts had been mistaken for it. Many important acts are by the late statute required to be done by the magistrates, inspectors, &c., conditionally that they shall believe the distemper to be in any suspected place, or within a certain distance of it. But on what shall they ground such a belief on a subject of which they have

which would be efficacious, yet there are several circumstances with respect to which it is not hitherto ascertained by a sufficient field of experience what precise degree or mode would be most effectual and best. Proper measures are therefore taking for having such trials made in Holland, where a too fair opportunity is at present afforded, and the result of them when they are completed will afford the means to lay down hereafter with more certainty those rules and directions as to each particular, which may be most effectual with regard to the cure, and advantageous with regard to the expense. In the mean time the generals here presented may enable any person versed in medicinal subjects to give direction for the putting the cattle under the due regimen if a just occasion should demand it.

no means of judging? or who shall be qualified to certify sufficient matter of evidence to them, when everybody around them are equally in the dark with themselves as to those principles which furnish such means? This seems to be a difficulty in the due execution of the Orders of Council for destroying the suspected cattle, and laying restrictions on the removal of those probably exposed to the contagion, which renders their operation extremely uncertain, and may cause great inconveniences from conscientious and zealous attempts to enforce them where the facts on which the right determination of measures wholly depends are so easily to be mistaken. The method to remove this difficulty is suggested by the very nature of the subject itself. It is obviously the providing the proper means of information of the characteristic signs of this disease, and circulating the intelligence of them as generally as of the Orders of Council themselves, in the doing which the following manner seems most easy and effectual according to the present state of things :—

'A brief account of the most discernible and peculiar symptoms of the disease and of the appearances in the inward parts of the beasts which die of it should be procured. This account should be drawn up in the most clear and simple manner, and expressed in the most clear and simple language, divested of all terms of art, and accommodated to persons of ordinary capacity. It should then be transmitted to every parish, and disposed of there in such manner that all the inhabitants may be apprized of, and have easy means of recourse to it whenever they may have occasion, and more particularly those who are officially concerned in the execution of the Orders of Council. In order to do this most conveniently, it may be proper to follow in some measure the same method which is taken to promulgate the late Act of Parliament and the Orders of Council. It is ordained by that Act, a printed copy of the same, together with any Orders of Council made in pursuance of it, shall be provided by the churchwardens, &c., of every parish with intent that they may be read by the minister the next Sunday after the receipt of them, and afterwards on one such Sunday in every calendar month as he shall think proper; and also that they may be kept by him in order to his permitting every person residing in his parish to read the same during the time the respective Orders of Council may be in force. Now it would be expedient to join a printed copy of the account of the signs of the disease with those of the Act of Parliament and Orders of Council, that it may be always ready to be consulted along with them, or separately, by all persons who may have any need of such information.

'It would likewise be very expedient, in order to the rendering

more general a due knowledge of this disease, to have a copy of the account of the signs of it, being printed on an open sheet of paper, hung up in a proper frame in the market-house, town-house, or any other public building in each parish, where the people may constantly have recourse to it, without troubling the minister, which would induce them to take more readily the pains to obtain the requisite information from it. Another copy should be always in the possession of every magistrate, inspector, or other person who has any official concern in the execution of the Orders of Council, that they may have the necessary means at hand of enabling them to judge how far, in any suspicious case, there is just ground to conclude the actual presence of the disease.

'As the greater or less success of the injunctions or regulations ordained by the Government for the preventing the bringing into our country the contagion of the murrain, or for suppressing it if brought, depends on their being more or less generally known, it seems that the present means of publication of them are defective, as it is certain that by such means only a small part of those, whose conformity to them is requisite to the end, can be possibly thence apprized of them. A proclamation of all Orders of Council respecting the disease is inserted in the *Gazette;* and the last Act of Parliament directs them, as abovementioned, to be read one Sunday of every month in the parish church, or other place of public devotion. But few of the common people, and perhaps even the magistrates, &c., constantly read the *Gazette* in the country; and there are many parishes into which it never comes at all. Numbers of persons, being of other sects of religion, do not go to the parish church at any time; and others are very liable to be absent on the particular days when these Orders are read. The churchwardens or other officers, moreover, who are to provide the copies of them, not having an opportunity of seeing the proclamations in the *Gazette*, are sometimes entirely uninformed of them, and therefore do not provide the printed copies of them as directed. For these and other reasons the reading them duly in the church is often neglected, and consequently the whole or a great number in every parish are left ignorant of what is ordained. It is necessary hence that some more effectual method of publishing the contents of the proclamations should be pursued; and it would be, therefore, right that the contents of them should be printed in the manner before proposed for the account of the signs of the disease, and hung up with it in the most public place in every parish, which could not fail to make them much more generally and perfectly known than they can be at present. This should be, under the circumstances now subsisting, particularly attended to with

regard to the seaports, and parishes adjacent to them, of the eastern and southern coasts of the island, where the danger is by far the greatest of the distemper's being now conveyed to us from the shores of the opposite countries, where it rages with great violence. To obtain the greatest security, it would be expedient that the printed copies of both these kinds should be actually sent to every such parish to be disposed of as above advised, and the procurement of them not solely intrusted to the churchwardens, by whose ignorance of the proclamations, or inadvertence, it will be frequently omitted. Or at least, notices of the Orders of Council, &c., and the injunctions on the churchwardens to procure them on each occasion, should be advertised in all the principal newspapers, as well in town as country. In order that the whole of this should be duly executed, it seems further requisite that some proper officer should be appointed by the Crown to take the charge of doing it on him, and to see that what is ordained may be duly complied with.

'Some measures of the kind here pointed out are indispensably necessary to give us any hopes of the good effects of the ordinances of the late Acts of Parliament respecting the prevention of the murrain, which can yield but little safety from it unless generally complied with. For if, from want of due conformity to them, the disease should find its way into this island in any one place, and spread itself thence widely to others, as may in such case quickly happen, it will not be of the least avail that the strictest observance of them has been practised in a thousand others, since the dreaded mischief may as well diffuse itself, with all its calamitous consequences, over the whole of our country from one single original source as from any multiplicity whatever.

'There seems to be a very material error in the regulation ordained in the late Acts respecting the prevention of the removal of such cattle as may possibly have been exposed to be infected by the murrain, or to contract contagious matter on their skins from being near other beasts seized with the disease, which error may be productive of great inconveniences if the regulations be duly observed, or raise motives in those whom it concerns for not paying due obedience to the ordinance. This is the too great length of time required when the infection is supposed to be in the neighbourhood, for the purchasers of cattle to keep them before they sell them again. Forty days is the time prescribed, and when all the facts from which the determination of the proper period must be deduced are duly weighed, it will appear to be at least two-thirds longer than is necessary. The only reason that can be assigned for the expedience of a restriction as to the time of selling cattle in these cases is, that the seller may be able to give such a certificate to the

buyer as affords the best assurance possible that the beast has not taken the infection, nor is likely to convey the contagion by any infectious matter adhering to its skin, though not affecting itself, from any diseased beasts it may have approached to others which may come near it. This period of forty days is allotted because such a certificate could not be made by the owner unless the beast had been long enough in his possession to show it had not been infected before it came into his hands, and to afford time for the infectious matter, if any had been contracted by its skin, to have lost its virtue or been worn off, and because it was presumed a less space of time would not have been fully sufficient for this effect. As to what respects the having actually received infection, forty days' possession is much longer than is needful to manifest whether or no such infection was taken by the beast before he came into the seller's hands, since the symptoms would have shown themselves, and the beast would have died of or recovered from the disease long before half that time was expired.[1] As to what respects the contagious matter that may be contracted by the skin of the beast from others infected, the time in which such matter may lose its contagious power, or the skin become free from it, cannot possibly be ascertained, and there is reason to believe it might go much beyond forty days, but there are easy means to be employed of taking away the hazard of conveying the disease to other beasts in that way, with far greater certainty than can result from the waiting even a much longer space than forty days without the use of such means.

'The time in which the symptoms appear to come on in the murrain after the taking the infection is, as we have above observed, almost generally on or before the fifth day.[2] But as there may be, though

[1] It appears, from the experiments made at Utrecht in 1769, as above mentioned, and from others, of the inoculation of the cattle for the murrain, that the longest period in the case of beasts so treated betwixt their receiving the infection and their death was not more than fourteen days. The observations on the same period, with relation to such beasts as have taken the disease from others without inoculation where it could be ascertained by the known time of their coming within the reach of the infection, show the longest extent of it in such cases to be about seventeen days. But this must be understood to be according to the course of the disease in Holland. For in our country the death of the beasts taking the disease naturally was found to happen almost always within twelve or thirteen days after the infection, the crisis or turn of it, as we remarked before, being about four or five days earlier here than in the United Provinces. It must be comprehended, also, that this period of death regards beasts which are carried off by the murrain, considered as an acute disease; for where they die, after their recovery from the proper symptoms of the distemper, of ulcers or abscesses in the viscera produced by it, no regular period can be fixed on, as those accidents or their consequences differ in every subject where they happen.

[2] There is a remarkable uniformity in the operation of the contagion of the

rarely, a variation that requires some latitude, we may rate the longest time to be the seventh day. In a very few beasts, however, which have the disease in the most mild and gentle manner, we may also allow time for the aggravation of the symptoms, till they become strong enough to be so clearly perceptible as to leave no room for doubt, and suppose in those instances they may not be very observable till the tenth day. But this is the utmost concession as to the extension of the time in which the infection can lie concealed without sensible effects, that facts will admit us to make; and if no appearances of the disease be found at or before that period, it may be very safely concluded the beast had not taken the infection before the commencement of such time. If, nevertheless, we should go somewhat further to satisfy all scruples as to the inaccuracy of these observations, and stretch our caution to the utmost that can be deemed reasonable, the keeping the beasts twelve days after they are purchased is fully sufficient to determine with the most positive certainty that they were not infected before such purchase. There cannot be the least reason, therefore, to keep the beasts longer than twelve days before they are sold in order to avoid the hazard of their having received the infection before they came into the hands of the owner.

'The other more specious reason for restraining the sale of cattle during so long a period has not, at the bottom, a more solid foundation in the reality of facts than the preceding. No precise limits can be assigned to the time that beasts, having the infectious matter of the murrain lodged on their skins in consequence of having come near beasts seized with disease, may communicate it by that means to others.

murrain as to the time it produces sensible effects when communicated by exterior infection. In the above-mentioned experiment made at Utrecht, twelve cows were put to six others that were inoculated, and kept with them in a confined place from the time of inoculation. The twelve were all seized with a cough and gnashing of their teeth the seventh day after the inoculation of the six, and did not exhibit the least difference in the period of their being affected by the infection, which may be concluded to have been taken five days before, as at that time, though it was but the second day after the operation, febrile symptoms began to appear in some of those inoculated, one of which, indeed, was so weak on the third day that she fell down, and had not strength to rise again. The same uniformity is not in the least found in the inoculated beasts, but in most of them the symptoms come on with much more celerity and violence than in those which have the disease by casual infection. Many other facts confirm this observation of the almost constant equality of time in which the visible effects are produced in the cattle which have the murrain by natural means, and they leave us no room to suspect that the infection ever lurks after it is taken without revealing itself more than six or seven days, even where its action is the weakest.

'The contagious matter will preserve its infecting quality for a long space of time, as we have reason to conclude, as well from facts respecting the transmission of it into distant countries, and some experiments regarding inoculation with it, as from its analogy to the variolous matter of the small-pox, which retains its virulent power for many months. There is room to conclude that the contagion of the murrain has been conveyed by the raw hides of beasts in particular, to places where it has taken effect at a considerable space of time after its production; and if it can be so preserved in the skins of dead beasts, why not in the hair of those which are living? It must be granted, indeed, that in the skins of the living it is more exposed to be accidentally carried off than in those of the dead; but there is no certainty, nevertheless, that it will be entirely cleansed away thus under a long time. Even forty days, therefore, do not give a security against the danger of a conveyance of the infection that way, where beasts are removed from the diseased cattle to the sound. I am aware it will be advanced, in contradiction to this, that the skin of a living beast being exposed to the air, the contagion will be dissipated in the forty days, and not preserved, as in the parts of the hides of dead beasts, to which the air may not have had a like access. But I deny the truth of the principle on which this conclusion depends. It has, I grant, been a prevailing notion, borrowed from ancient writers, and delivered down by those of succeeding times without any examination of the relative facts, that the contagion of the febrile diseases resided in volatile effluvia, which exhaled in the air, and flew off in a short time from bodies that had received them. There is not, however, in reality a greater error subsisting than this established notion. Many experiments on the variolous matter have evinced the contrary by showing that it will keep its virtue, and serve for the purposes of inoculation, for a great length of time, though exposed to the air, provided it be defended from excessive cold, and such moisture as would render it mouldy. A less extensive field of observation, but sufficient to verify the principle, confirms to us that the analogy holds good as to this point, on the contagious matter of the murrain, and others of a similar nature. If, therefore, the virulent matter will not with certainty be taken off by accidental means from the skins of beasts, nor lose its infecting power by exposure to the air under a long time, the preventing for forty days the communications of cattle whose skins may have some share of it on them, with any others, is not a full security against their conveying the infection, if afterwards they be suffered to mix with the sound. The establishment of this species of quarantine or prohibition of removal for forty days is consequently insufficient to the end in that view. But, besides the uncertainty of its

effects, and the great inconveniences to particulars it may produce, it is less proper and expedient in this intention, because there is another method by which the same end may be answered in a much more easy and effectual manner. The method I mean is the cleansing the beasts by artificial means, which should always be practised where there is the least danger of their transmitting the contagion from those infected to the sound without having taken the disease themselves. This may be commodiously and efficaciously performed by scouring the skins of the suspected beasts by a proper brush with fine sand and water, and afterwards thoroughly washing off the remainder of what may adhere by water and a mop. By these means the skin of any beast will be more perfectly freed from infectious matter that was lodged in it than by the accidental wearing off in a very long space of time; and if it be duly executed there can be no reason to put the sale of cattle under any restriction on this score. The practice of it should, however, be strictly enjoined by authority, if the time of restriction of sale be reduced as proposed, and the performance of it should be also made a part of the matter of certification.

As twelve days appear, from the above-given reasons, to be fully sufficient to show that beasts have not received the infection before, and as the keeping them much longer is not so effectual a means of taking away the hazard of their transmitting the disease by contagious matter adhering to their skin as artificial cleansing, the term of forty days' restriction from sale ought most evidently to be changed to that of twelve days, which saves more than two-thirds of the time. This shortening the term will be found a matter of very great moment, if ever the occasion for such a restriction shall again offer. The great inconveniences and embarrassments that would attend the obligation to keep cattle, however detrimentally to the owner, for so long a time as forty days, would, if it were largely extended, besides the injuring individuals, conduce, along with the other necessary regulations respecting the removal of cattle, to the causing a scarcity of them in the London markets, and others which are supplied from distant places. But, what is of still greater consequence, the loss and trouble that would result from it to individuals in some cases would furnish such motives for a non-compliance with the injunction as would in all probability defeat the intention of it. It therefore highly merits the consideration of those on whom the direction of this matter depends, to weigh well the premises, for a few failures of obedience to the Orders of Council respecting this restriction may render them wholly ineffectual.[1] There is no

[1] It may be speciously said that in a case of so much moment as the prevention

maxim more true than that a law of this kind should be void of everything strongly repugnant to its own operations, or it will prove a dead letter.

'To evince more forcibly the extreme great consequence of guarding against the introduction of the murrain into our country, I will here subjoin an account of its late effects in the United Provinces, whence the deplorable havoc it makes there will appear in the most striking manner. The source of the information respecting the facts I shall advance is the registered lists[1] of the cattle in the south and north divisions of

of the murrain, the interest of particulars must give way to the good of the public, that it is best to err on the safe side by taking a full scope of time, which has been deemed forty days, to render the matter entirely clear, and that if the cleansing be a further security it should be added to the restriction of sale for that term. This way of reasoning must be allowed to be right as to the general principles, and ought to be adopted where the facts give just occasion for it, but it fails in that point to be applicable to the present case. The extending the length of time of the restriction so much as forty days, does not render the effect of the prohibition more certain, but evidently the contrary. It is shown above, that if the cleansing be put in practice along with it, twelve days will be as effectual as forty, and there is a great probability, when the time is not required to be longer, it may be complied with, there being few cases where it would there be considerably detrimental to the owners of the cattle. Whereas there is the strongest reason to apprehend the longer term would not be generally complied with, and therefore the ordaining it must counteract its own purpose, as the security proposed from it wholly depends on a general conformity to it. When obedience to any matter ordained is enforced by a penalty, such penalty will ever fail of its full effect when the gain accruing from disobedience is more than equivalent to the risk of the forfeiture, as we daily see in the 'great multiplicity of contraband trade. But this principle must hold good still more strongly here, where numbers of persons are unavoidably subject to loss without disobedience, than where, as in the case of smuggling, the occasion of it arises only from a voluntary pursuit of profit. The obliging people to keep their cattle so long as forty days, when the injunction suddenly and unexpectedly takes place in cases when they are not provided with fodder to maintain them, nor possibly may be able to procure it without the most distressful difficulties, or where they may lie under a necessity of selling the beasts to raise money they instantly want, will of course create temptations to risk the penalty that can scarcely be withstood by the weaker part of those who may lie under these circumstances; whence it is both against reason and observation to form expectations of a'general conformity to such an injunction. But if the chance of the loss and inconvenience that may casually attend the keeping the cattle be almost wholly taken away, by reducing the forty to only twelve days, the motives will be proportionably removed for running the hazard of incurring the forfeiture by a non-compliance with what is required, and there is just ground to hope that the regulation would be then fully effectual.

[1] The copies of these lists did not come to my hands till after most of the foregoing part of this dissertation was printed, otherwise I should have made use of the contents of them in support of several matters I have advanced there, which the inferences to be drawn from them greatly tend to confirm.

Holland, which I shall incorporate, and these provinces taken together are nearly equal to one-half of the whole United Provinces. In order to give this account in the most clear manner consistent with brevity, I will enumerate all the particulars of the state of the cattle for the nine months preceding the 1st of July last, because they are completely exhibited in the registers during that term. To this I will annex the total numbers of those that died and recovered in one year, commencing the 1st of April, 1769, and also the number which died and recovered in each of the three succeeding months, as this latter detail leads to some as well curious as useful conclusions:—

'Persons keeping cattle in South Holland and North Holland during the term of nine months, commencing the 1st of October, 1769	17,379
Cattle in the possession of those persons during that term	224,999
„ infected with the murrain	141,273
„ died of the murrain	98,995
„ recovered after taking the infection[1]	39,613
„ escaped the infection	77,850
„ died of other diseases and casualties	6,488
„ remained ill of the murrain at the end of the term	25,53

Cattle infected in the term of a year commencing the 1st of April, 1769	210,819
„ died of the disease during that term	159,128
„ recovered in that term	61,691
„ infected in the summer season of that term, commencing the 1st of April and terminating the 30th of September, 1769	86,423
„ died in the summer season	63,281
„ recovered in the summer season	32,142

[1] It may be inferred from this account, that considerably more than half of all the cattle in the United Provinces took the infection of the murrain in nine months, and that almost two-thirds of those which were infected died. The number, both of those which caught the disease and of those which were carried off by it, is proportionably far greater than was found here, while the disease raged most, and even than has been usually known in Holland, at least one-half of the infected having generally recovered. This evinces the present excess of power in the predisponent cause, or disposition of the cattle to be affected, and verifies by glaring facts what I ventured to assert relating to it, from theoretic reasons, in the foregoing part of this dissertation, which was printed some months ago, before I had any particular information respecting these facts, and, indeed, before the report of them could be made and registered.

Cattle infected in the winter season;[1] commencing the 1st of October, 1769, and terminating the 30th of April, 1770	134,696
„ died in the winter season	95,947
„ recovered in the winter season	38,749
„ infected in the term of three months preceding July, 1770[2]	3,912

[1] The number of cattle infected in the winter is, in this account, above two-fifths more than in the summer. The reverse of which appears with respect to the plague in the eastern countries, where the contagion of it, for the most part, ceases, or at least greatly abates, in that season. But the principle whence this seemingly great variation arises does not, nevertheless, lie in the nature of the diseases, nor even in that of the predisponent cause of infection in the subjects, which is in fact the same in both, but in the local difference of circumstances with respect to the production of that cause. It is the weakness of the subject in both cases that constitutes the susceptibility of infection, and that weakness is induced in different seasons from each other by a diversity in the climate and other circumstances attending the places in which the respective disorders, as here compared, prevail. In those eastern countries where the excess of temperature lies in the heat of the summer, mankind, the subject of the plague, are in a too relaxed state, and the juices so putrescent in many individuals as to render them much weaker than in the winter, which is there mild and salutary. In the United Provinces, on the contrary, the excess is in the cold of winter, which, being attended with great moisture in the air, makes the cattle, the subject of the murrain, much weaker than in summer, to which the housing them, as is there practised from necessity during that season, much contributes. The increased violence of it in winter and remission in summer, did not subsist here while the disease prevailed in our country in any proportion to what it now does in Holland, the less damp state of the air, and the keeping the cattle more out in the fields, having prevented them from being weakened by the inclemency of the winter, as there. On the contrary, this was so far from being the case, that Dr Legard says: 'This disease being a contagion of the pestilential kind, is susceptible at all times and seasons. In autumn and summer it will rage most, in spring and winter least, according to the alterations commonly happening in those seasons.' He carried it much too far, as is evident by the facts here exhibited, in saying generally the disease will rage most in summer and least in winter, but he spoke from theory only. For supposing, as he intimates, the murrain to be analogous to the plague, he concludes the same effects would always attend the contagion of both without considering the predisponent cause on which the operation of it depends may vary in different places. A more close inquiry, perhaps, into the course of the distemper here would have prevented this error. The whole, however, concurs to demonstrate there is no intrinsic difference in this point betwixt the contagion of the plague and that of the murrain, but that the variation of the effect of them depends on the variation of circumstances respecting the predisponent cause in different places.

[2] The number of cattle infected in these three months is only in the proportion of about an eighteenth part of those in the winter season, and yet of them near four-fifths died. These beasts may, therefore, be presumed to be such as laboured under some constitutional or other peculiar cause of weakness, from which the favourable temperature of the weather could not free them. In June the number infected was

Cattle died in that term	3,048
„ recovered in that term	864
„ died in April of that term	1,254
„ died in May	1,325
„ died in June	469
„ recovered in April of that term	452
„ recovered in May	303
„ recovered in June	109

'It appears from the finance accounts that the province of Holland, if the two divisions of north and south, from the separate lists of which this account is formed, be taken together, may, as was before intimated, be considered as one-half of the Seven United Provinces, at least with respect to the cattle. So that if we admit the supposition, for which there is good ground, that the ravage made by the murrain was nearly the same in the other six provinces as in that, we may conclude that the loss of cattle destroyed by it in the whole was not less, in one year commencing April 1st, 1769, and ending March 31st, 1770, than three hundred and eighteen thousand beasts. And there is little room to hope from appearances that the disease will be less violent this year than it was the last.

'If we reflect that this immense loss is, in some degree, annual at present in the United Provinces, we cannot but deem the being afflicted with the murrain a most deplorable calamity, and this uncommonly strong prevalence of the contagion there ought to be equally an object of our dread as of our compassion. It shows a very great predisposition in the cattle to be affected by this disease; and that predisposition is owing to causes which, from their very nature, are extended over all the neighbouring countries in some proportion, as is further

not one-sixth part of that of either of the two preceding months, nor consequently in the proportion of so much as one-hundredth part of those of the winter season; the number which died were, nevertheless, still more in proportion than in two preceding months. This evinces that the heat of the weather, though favourable to the beasts in health as to preserving them from infection, was injurious to those whose weakness made them take it, which may be easily accounted for from the greater tendency that the animal fluids have to putrefy in hot seasons. Whence it may be inferred that it is not a greater disposition in the humours to putrefy independent of weakness, which causes the susceptibility of infection, but weakness only; and that, therefore, unless the degree of this disposition be such as induces weakness, it does not contribute to the reception of the contagion, though to its stronger operation when received. This confirms what I have above advanced, that putrescence has not primarily any concern in the cause of the murrain, but in the consequences of it; as, being either before subsisting or produced by the operation of the infection, it aggravates the fatal effects as a secondary cause.

manifested by the actual progress the contagion is now making in parts where there is no epidemic or local cause in the cattle of the susceptibility of the infection. We see, by his Majesty's late proclamation, that it has passed into Flanders, and is now spreading thence to the adjacent countries of France,[1] where there are no unfavourable circumstances, as in the United Provinces, for the beasts to be more particularly subject to the disease, unless, in common with those of the neighbouring countries, from the accidental influence of bad seasons. This cause subsists alike with us, and we are equally exposed to all the mischievous consequences of the contagion if it be introduced into our island; which, without the greatest care in the exercise of due preventive means, is extremely liable to happen from the proximity of the place where the infection now prevails, conspiring with the susceptibility of it that attends the cattle at this period. It therefore highly behoves every individual to exert his utmost endeavours, according to his situation, to avert this impending danger of one of the most heavy calamities that can befall any European country, and more especially our own, where the luxurious habits of the common people, the difficulty of obtaining a supply of cattle from other places, and the high prices of the necessaries of life, would render the effects of a scarcity of horned beasts, and consequently all other provisions, peculiarly grievous and intolerable.'[2]

[1] This rapid progress of the contagion, and extending of its effects into places where it spontaneously extinguished a considerable number of years ago, and has never before revived since, is, together with the great epidemic prevalence of the disease in Holland, displayed in the above-given account, a strong confirmation of the truth of the principles, whence I formed a judgment *à priori* of the present susceptibility of the infection in the cattle throughout all these parts of Europe. As my prediction relating to the consequences of it, given in the foregoing part of this dissertation, is verified by these facts, which have happened since the printing it, the certainty of those principles ought to excite the greatest apprehension of our danger from them, and the most powerful motives for our very earnest attention and care to guard against this menacing evil.

[2] *R. Dossie.* 'Observations on the Murrain or Pestilential Disease of Neat Cattle.' Memoirs of Agriculture, vol. ii. 1771. Dr Darwin, writing in 1796, thus speaks of the Cattle Plague: 'The *pestis vaccina*, or disease amongst the cows, which afflicted this island about half a century ago, seems to have been a contagious fever with great arterial debility; as in some of them, in the latter stage of the disease, an emphysema could often be felt in some parts, which evinced a considerable progress of gangrene beneath the skin. In the sensitive inirritated fevers of these animals, I suppose about sixty grains of opium, with two ounces of extract of oak-bark, every six hours, would supply them with an efficacious medicine; to which might be added thirty grains of vitriol of iron, if any tendency to bloódy urine should appear, to which this animal is liable. The method of preventing the infection from spreading, if it should ever again gain access to this island, would be

We have already traced the disease on the Continent of Europe. In 1740, Hungary and Bohemia were suffering from it, and the whole of Germany participated in the invasion; through the south it passed into Switzerland, Piedmont, Franche Comté, and Dauphiné; northwards, it spread from Poland to Courland, Livonia, Denmark, Sweden, Holland, and England. In 1742 it was imported into Lorraine and the Vosges, and, according to Courtivron, it followed the army in 1743 from Bavaria into Alsatia. The same year it again entered the Dauphiné and Franche-Comté from Switzerland, and continued to commit great havoc among the herds in France during the years 1745, 1746, and 1747. The Plague entered Italy both through Piedmont and through Venice. It passed into Piedmont during the war of 1744, and led to terrible losses in Upper Italy. Speaking of the misfortunes of war in 1745, Muratori says: 'And they were not all the misadventures of Piedmont. In the preceding year the Cattle Plague had penetrated in these parts, and it was calculated that about 40,000 oxen and cows had died. A potent means of spreading any pestilence is war, which breaks through every precaution or measure suggested by human prudence. It was owing to this that the malady extended its deadly influence in the preceding year, through Monferrato and other parts of the Sardinian kingdom, and thence passed to the districts of Milan and Lodi, reaching Piacentino, beyond the river Po, winding its course along the rivers in the Bresciano, and spreading alarm through Lombardy. The destruction was beyond description; and what may be the consequences of so serious a catastrophe, I need not teach those countries which have been desolated, and which have been at the same time oppressed by the weight of war. It has been estimated that 18,000 head of cattle perished in the States of Milan.'[1]

immediately to obtain an order from Government to prevent any cattle from being removed, which were found within five miles of the place supposed to be infected, for a few days, till the certainty of the existence of the pestilence could be ascertained by a committee of medical people. As soon as this was ascertained, all the cattle within five miles of the place should be immediately slaughtered, and consumed within the circumscribed district, and their hides put into lime-water before proper inspectors.'—*Zoonomia*, vol. ii. p. 249.

[1] *Muratori.* Op. cit., vol. xii. p. 345.

In the month of October, 1745, the Steppe murrain penetrated the Tyrol; from Carinthia it once more travelled to Venice, and only ceased in that State in 1749. In Northern Germany, Prussia appears to have suffered most severely; but it did not appear in Saxony, it seems, until 1746.[1] In Prussian Lithuania, according to Gallesky, more than 145,000 cattle were swept away in 1750. It passed through Germany to Holland in 1744, and in two years destroyed in that country upwards of 200,000 head of cattle. The faculty of medicine at Leyden was at this time consulted as to the means whereby the Plague might be abated, and its report was published in Dutch by Luchtmans. In 1745, Professors de Haen, Ouwens, and Van Velse, and Dr Weiterhof, wrote a dissertation on the subject, which was published at the Hague, and M. Engleman contributed an essay to the Seventh Volume of the 'Acts of the Society of Haarlem.' From 1745 to 1749 it killed 280,000 animals in Denmark. 'The 14th of January, 1746, was appointed a day of public fasting and prayer to be observed all over Denmark on account of the mortality among the cattle through that kingdom. It is reckoned to have carried off no less than 60,000 before the middle of December. It advanced likewise in Jutland, and the apprehensions of it engaged most people to kill their cattle.'[2] It entered Sweden, and, according to Linnæus, in the province of Schonen alone 32,584 oxen and cows died, leaving alive only two per cent. of the entire horned stock of the province.[3] In the little island of Oesel, in 1750-51, no fewer than 20,000 cattle succumbed. From Holland the disease penetrated Austria and French Flanders, reaching Laon, and in Artois and Picardy destroyed 11,000 animals.[4]

Between 1740 and 1748, it was estimated that Western central Europe had lost no less than three millions of cattle.

The Continental authorities who have observed and described the disease at this time, as will be seen by a reference to the foregoing essay, are very numerous, and much difficulty is ex-

[1] *Rumpelt.* Beiträge zur Geschichte der Vieseuchen. Dresden, 1776. Vol. i. p. 117.

[2] Scot's Magazine, vol. xvii. p. 605.

[3] *Linnæus.* Schonensche Reise.

[4] *J. Gamgee.* Op. cit.

perienced in making a judicious selection from among them to illustrate what was then believed to be the pathology and nature of the plague, or the measures, medical and legislative, most appropriate for its cure or prevention. However, a brief notice will be offered of some that now come to hand, and the student desirous of learning more can refer to the works, the titles of which are given.

We will commence with Holland.

The physician Clerc,[1] who was in that country when the disease raged there in 1744-5, and at the commencement of '46, informs us as to the character presented by it at that time.

The symptoms were: staring of the coat, universal shiverings, the eyes red or yellowish, and looking as if buried in their orbits. Tears ran from them, and mucus from the nostrils, which were in many cases swollen, and in others constricted and very red, without discharge; sometimes convulsive twitchings were noticed about them. The upper lip appeared tumified, the under one pendant, the gums were often red and inflamed, and the veins in them enlarged; there were also small yellowish pustules, ulcers, and aphthæ over the gums and palate as well as the tongue; these increased before death. There appeared buboes or inflammatory swellings about the dewlap and the flank. The hind quarters could not support the least touch, they were so painful. The throbbing of the arteries was strong and frequent. The labia of the vulva were tumified, and secreted a virulent matter. Towards the end of the second day, the respiration became difficult; this difficulty increased rapidly. The animal gave utterance to deep sighs and groans, and saliva flowed from the mouth. This matter became bloody on the approach of death. The animals never slept; and they died on the fourth, the fifth, or the sixth day, as if they been slain by the stroke of a poleaxe. The urine was not much altered, but the fæces were yellow-coloured, purulent, and fetid shortly before they perished. Un-

[1] *Le Clerc.* Verhandeling van de tegenwordige, &c., door vier Geneesheeren. Hague, 1745. Essai sur les Maladies Contagieuses du Betail, avec les moyens de les prévenir et d'y remédier efficacement; par *Clerc*, ancien Medecin des Armées du Roi en Allemagne. Paris, 1766.

like Boerhaave, he could not perceive any difference between the milk of a healthy and diseased cow.

These symptoms agree with all those which were noticed in cattle in the neighbourhood of Haarlem, and those described by the physicians of Königsberg. In ordinary cases, it was only necessary for some of them to be present to warrant the steps which he recommends, and he begs of every one who may read his work to be persuaded that every contagious poison, although transmitted in a very small dose, yet produces rapid and murderous effects in destroying the organs essential to life.

A large portion of the book is taken up with hypothetical reasonings on the phenomena observed.

Seventy animals which had died of the disease were examined by him. These are the results. The eyes were spread over by livid and brown-coloured veins. The matters in the nostrils, the mouth, and elsewhere, were bloody and very putrid. The rigidity of the limbs, the hind ones especially, was very great. The subcutaneous cellular tissue was black, dry, and inflamed; the flesh brownish-coloured. There was little alteration in the brain: its vessels were often varicose, and its membranes offered traces of inflammation, especially in those which had been continually comatose. The lungs were not always healthy, but often red, livid, or gangrenous, and covered with black patches. The membrane lining the windpipe was easily detached. The heart bore traces of the contagion. The diaphragm, pleuræ, and pericardium were always inflamed or gangrenous. The cavities of the heart were always filled with a burnt-looking blood or a brown sediment. The liver and spleen were of a black colour, and distended with blood like ink. It was dangerous to examine too closely the stomachs and other viscera, for the stench would induce syncope. The bile was caustic and burning. The stomach was inflamed, and the third compartment contained black dry food, looking as if it had been baked. Its lining membrane was very easily separated. The fourth compartment was of the colour of red lead, and contained yellow matters having a most offensive odour. Boerhaave found extravasated blood of a black colour, and burning and fetid. The intestines were much distended with gas, and variegated by livid

spots. Clerc has observed inflammation of the uterus, and remarked that even the fœtus contained in it had not only the intestines diseased, but that the thorax and abdomen were filled with a bloody-coloured humour of a bad smell.

With regard to treatment, it is here, says the author, that art is rigorously limited, and is obliged to confess that it possesses no certain remedy for the contagious poisons. Their elements are so subtle that they have escaped analysis. It is this which opposes our discovering a preservative or an efficient specific. But treatment might nevertheless be tried on reasonable principles. Plentiful bleedings should be resorted to before the third day, after which they were useless, if not mortal. Purgatives were of little service, in general doing more harm than good. The diet should be barley-meal boiled in skimmed milk. No hay was to be given. As the animals recovered the gruel was to be increased in allowance. The diseased were to be currycombed twice a day. The stables were also to be cleaned out twice a day, and perfumed every six hours with vinegar thrown on hot bricks. Gunpowder was also to be burnt in them. Setons he much lauded, especially when put in the dewlap. The simplest means of treatment were the best, and far to be preferred before the irritating, acrid, hot, and incendiary remedies so much in use. Animals are composed of the same elements as men, therefore do the same curative principles apply to them.

In the precautions taken to prevent contagion, it is expressly laid down that all communication be immediately cut off between the infected and the healthy. Setons should be employed in the healthy animals, and they should be currycombed every day. Horses should be kept in the cow-houses, as the soil of these animals prevents the contagion reaching cattle. The dew is regarded as a mass of vapour, which, raised from the earth, is condensed by the cold at night and descends again. The plants which then become charged with it may transmit deadly principles. Animals must not, therefore, be sent to the pasture when there is dew, but only after it has been dissipated. Above all things, it is necessary to kill the first beasts attacked with the plague; then to take them to a place altogether

apart, and burn them. But if a great number are attacked at the same time, this means of smothering the disease will be no longer practicable. It is then necessary to separate the animals yet healthy, and keep them as far as possible from the diseased; and no intercourse of any kind should be permitted.

He founded his medical treatment of the malady on the supposition that it was due to the presence of an *animated or verminous matter in the blood*, similar to that which Père Kircher had asserted to exist in the plague of man, and Cogrossi and Valisnieri in that of animals.

Grashius wrote an excellent treatise on the Cattle Plague, in which he asserted that he knew of six cows which had recovered from the disease for more than fifteen days, and yet four of them were attacked a second time and died.[1]

Mauchart writes from Tubingen in 1745: 'Until this time the disease has abated but little. It appears to be confined to the bovine species alone, and does not affect goats, horses, pigs, sheep, or fowls; at least, very few examples to the contrary have occurred in our locality; indeed, the only exception I heard of occurred at Tubingen, where it is said the disease was communicated *from a cow to a goat which was stabled with it*, and which, after a violent death, on being dissected, exhibited the gall-bladder enlarged and very much distended. A certain man named Respondens, remembers a similar incident which occurred at Reutlingen. Some fowls died in a very short time in one house, and on their being examined it was reported that they had greatly-distended gall-bladders. In the beech forests of Wyliæ, in a former winter, when the Cattle Plague raged there, a certain man having slain his cows, which were seized with the disease, threw the corrupted intestines to his pigs; these likewise became affected, and died of the disease. While this malady raged, we were informed by credible authorities that wild beasts had been found dead from this disease in the neighbouring woods. Wild boars, and, indeed, some of the deer tribe, were

[1] *Grashius.* Uitgezote Verhand. uit de nieuwste werken van de Societeiten van Wetenschappen, 1758.

also observed to have perished.[1] During almost the whole time of this plague amongst cattle diseases were very rare in mankind, and neither by endemic nor epidemic maladies were they increased whatsoever. Only here and there one or two died from various sporadic affections. Strange to remark, of all the men who were engaged in tending and nursing the sick cows dying from the epizoöty, and of those employed in moving, flaying, and burying them, and breathing the thick, foul-smelling vapours, each and all remained safe and healthy.'[2] This was written at Tubingen, where the disease raged.

The same author, in another work,[3] has given a good description of the malady. He alludes to goats being susceptible to its influence, and recommends their separation from the diseased cattle.

The physician Ens[4] gives a description of the Cattle Plague as it appeared at Halberstadt, in Lower Saxony. It differed slightly from the disease elsewhere in being more acute, and accompanied by more inflammation. It manifested itself at first by an acute fever, marked by a hard pulse, an ardent heat, and excessive thirst; the breath was fetid, the urine high-coloured and in small quantity, the blood fluid and black, the nose discharging mucus, and all the body agitated; the walk unsteady, and the limbs vacillating. The animal carried its head low, and bellowed frequently. The secretion of milk was suppressed in the cows. The diseased creatures died tranquilly on the third, fourth, fifth, or sixth day; some few in two or three weeks. A small number had dysentery. This author appears to have established the prognosis of the malady principally on the nature of the intestinal discharges. If the evacuation of the excrements, which diminished always at the commencement, became established again, all the symptoms ceased in a short time; but when dysentery complicated the symptoms, the result

[1] This disease of the porcine tribe may have been an epizoöty of inflammatory fever or anthrax—not *the* Cattle Plague.

[2] *Haller.* Disput., vol. iii. p. 846. [3] *Bucard-Mauchart.* Med. de lue vaccarum Tubingensi. Tubingen, 1745.

[4] *Abraham Ens.* Disquisitio Anatomico-Pathologica de Morbo. Boum. Halberstadt, 1746.

was always fatal. It was remarked that all the cattle attacked were fat, in good condition, and vigorous, and that the lean and feeble were seldom affected.

The examination of twelve oxen which had died proved that it was an inflammatory disease, in which the digestive passages were principally attacked. The omentum was found inflamed; the first and second divisions of the stomach were full of food slightly moist; the third was more inflamed and distended than the two first; the leaves were black and sphacelous, and between them the food was found hard and dried; the fourth division was empty, contracted, and inflamed; the intestines in the same state; the rectum, in some cases, contained mucus mixed with blood. In general, all the viscera connected with the intestines participated in their inflammation, particularly the gall-bladder. The viscera in the thorax were scarcely altered. In the brain there was congestion of the vessels; the eyes were inflamed; neither the integuments, the tongue, nor the mouth exhibited any eruption of vesicles, pustules, or tumours; but the tail was rotten, for as soon as its enveloping skin was removed, it broke in many portions.

Ens, in seeking for the cause of this outbreak, remarks that the pastures in the neighbourhood had been flooded in August by great quantities of rain-water from the adjoining mountains, and which was charged with mud that corrupted the herbage; besides, the pastures contained many poisonous weeds. In the month of September a sharp frost suddenly set in, accompanied by a blight of rust on all the plants. The cattle which had passed the night in their stables were turned out in the mornings hot and perspiring, and fed on the tainted herbage, which, he maintained, was assuredly the cause of this very acute inflammatory epizoötic fever.

In the North of Europe, the Danish physicians gave the disease their serious attention. In the Memoirs of the Royal Scientific Society of Copenhagen for 1746, we find the results of their observations in curious, but yet interesting, details. From the moment, it is recorded, that an ox was attacked, it carried its head low, and its horns were cold; the tongue and the palate became blanched; the respiratory movements precipitous and diffi-

cult; the appetite disappeared, and rumination became suspended; and if death did not suddenly take place, the symptoms became more serious; the breathing became more troubled, the prostration more marked; the extremities began to experience nervous twitchings and spasmodic movements, which appeared to be accompanied with pain, and prevented their free extension. The thirst was sometimes intense, and when so the animal often had a suppression of urine and fæces. Usually, however, there was diarrhœa, and the matters were tinged with blood. Some moments before death the animal fell as if apoplectic, and lay without feeling or without movement; a thick, adhesive mucus flowed from the mouth and the nostrils; an aphthous-like appearance showed itself about the tongue; and those animals which resisted the violence of the early symptoms, towards the third week became covered with an eruption of pustules about the neck and the back, which degenerated into mange.

On opening the dead bodies, gangrenous patches were observed in the abdominal viscera, and particularly on the spleen and the third stomach (*omasus*). Traces of inflammation, of putridity, and of gangrene were always present. The blood contained in the spleen was darker than in health; the gall-bladder was always full of bile, and in it were frequently found calculi of various sizes; in some cases small worms were lodged in the biliary canal; in others the brain was softened, and the surface of the lungs speckled with livid gangrenous spots. What was reckoned the most extraordinary circumstance in these examinations, was the great quantity of black bile constantly found in the gall-bladder, and the calculi which they contained. In the third compartment of the stomach there was nearly always present a hard, arid, brown mass of food, looking as if it had been baked and hardened by the intensity of the malady. The heart was sometimes filled with polypoid concretions.[1]

For France, out of the many writers at this period who described the malady, I will only select a few.

Chomel[2] regarded the disease as a malignant, pestilential, and

[1] Acta Havniensia, vol. ii.

[2] Lettre d'un Medecin de Paris à un Medecin de province sur les Maladies des Bestiaux. Journal des Savans. 1745.

EXANTHEMATOUS (*pourpreuse*) fever, in fact, a true pest, manifested by gangrene, lividity of the viscera, and a dreadful stupor. He believed it to have taken its rise in Bohemia, while that country was the seat of war. From thence it passed to Hungary, Bavaria, the Tyrol, Alsace, and Upper Burgundy. Flanders did not escape, and it is truly fearful, he says, to think of the immense numbers of cattle these different countries have lost.

The symptoms were heaving at the flanks and hurried breathing. On making pressure over the loins, a crackling was heard, as if of dry parchment. They died at various periods—three, four, five, or eight days. Some were seen to die in four hours which had no external symptom of the disease, and yet when opened they exhibited all the pathological evidences of its presence—such as gangrene of the true stomach and the viscera covered with purple spots. The signs which preceded death, and which this writer had ample opportunity for observing, were as follows: the fever had been latent for a number of days before it showed itself, this period varying according to the disposition of the animal; indeed, it was observed that in some cows which the country people thought quite healthy, and which gave their usual quantity of milk, an attentive examination could discover considerable fever, with the heart's action doubled in movement and intensity, and often a slight cough. The symptoms developed all at once were: tremblings recurring two or three times during the day, the eyes red and tearful, the horns and the ears cold, the head hanging low, a thick and glutinous mucus flowing from the mouth and nostrils; rigors over the whole body, or confined to the thighs; the secretion of milk diminishing; frequent cough, heaving deep sighs, and a melancholy and languid appearance, accompanied by great insensibility. In the excrements, which were fluid, were seen, even during the first days of illness, streaks of blood. There was considerable diarrhœa, and sometimes the ejection of these matters was accompanied by colic. Sometimes there was remarked a convulsive twitching extending from the head to the termination of the spine. The paroxysms of fever resembled those of intermittent fever in man. While the exterior of the body was cold, the breath

and the interior appeared to be burning. The rumination entirely ceased. In cows the lips and the vulva were swollen, and from them came a virulent humour. On the teats appeared purple patches. Pustules often appeared in the mouth and on the tongue. The animals which recovered passed through several periods or stages. At first their eyes lost their redness, and the tears ceased. Their backs were covered with scabs or scales; the udders and teats were covered with small tumours or *boutons*. About their necks there were a great number of these pustules covered with scabs, which fell off after some days, and the beasts began to lick their nostrils and skins. This was particularly observed at Paris, in Burgundy, and in Franche-Comté, and was only noticeable in the few which recovered, and these were only oxen, or emaciated cows. The hair grew stronger and smooth, the milk returned, the fæces were more solid, and never any of those recovered had a relapse. Some had pustules on their tongues, which were scraped to the quick and then dressed with vinegar and salt.

The post-mortem appearances were: in the rumen a great quantity of moist food, possessing a disagreeable odour, although the animals had not eaten anything for three, four, and even eight days. The leaves of the third section of the stomach were black, gangrenous, and easily torn. The alimentary matters between them were hard, and similar to peat ready for burning; the fourth division of the stomach (*caillette*) was throughout of a reddish purple, mixed with patches of a deep or bright violet tint. Pus was also found in it. In many subjects there were dark spots on the liver, with hydatids and traces of gangrene in the lungs. The udder and adjacent integument had also livid blotches. The gall-bladder was generally full, and the contents were very fluid, though the colour was not altered. The rectum was frequently noticed to contain a little black blood. Sometimes the heart was dotted over with these patches; the uterus was affected in the same way, and if it contained a fœtus this was found suffocated by the blood. The larynx, the pharynx, the base of the tongue, the œsophagus, and the trachea had like stains of ecchymosis; the cavities of the nose were filled with a purulent matter.

In some dead bodies no palpable alteration was discovered in any of the viscera,—nothing save extreme distention of the gall-bladder.

The malady was excessively contagious, and it was in vain that the magistrates could prevent its diffusion by the wisest measures; the greed of gain of some, and the poverty of others, broke through all the bounds which had been made to restrain the pestilence. The remedies employed became impotent against so violent a disease; suspected animals were sold at a low price, and consequently those which were diseased spread the malady. It was a true plague, which, after passing from province to province, at last entered the capital. The magistrates of Paris, learning that, notwithstanding all the precautions taken by the police, the disease appeared at the same time in different parts of the city, held a meeting; at which, being determined to know everything concerning the nature and treatment of the affection, it was resolved to consult the faculty of medicine. Many doctors were sent to the infected quarters, and there beheld the awful ravages wrought by the plague. Day by day it increased in violence, and no one can imagine the number of dead and dying seen every day in Paris. Well known and well characterized, every effort was made to cure the scourge. But what obstacles! what difficulties! There were two principal indications to fulfil—unload the stomach of the enormous quantity of aliment it contained, and prevent the inflammation or arrest its progress. To meet the first indication, it was necessary that the diet should be of the most trifling kind—that which could never be enforced, however. Lastly, it was observed that all medicines such as brandy and gunpowder, and all the cordials, were injurious in this malady, though the proprietors of cattle always flattered themselves that marvellous results would ensue by giving large doses. In this way people have expended 350 bottles of wine on five or six cows in a very short time. Medicines were of no avail. External remedies, such as setons and the use of the actual cautery, were in most request, and were believed to have done some service in effecting cures. It was thought to be a good sign when these critical depôts, as they were termed, suppurated freely. Bleeding usually accompanied these remedies. In the

mouth was put, twice a-day, a masticator (*masticadour*), composed of salt, peppercorns, and a little garlic and honey. The ears and nose were rubbed many times a day with aromatic vinegar. The stables were fumigated with burning junipers, sage leaves, and rosemary and absinthe. The nourishment was light; a few herbs, bran, or barley, or rye meal were given in very small quantities.

Sauvages, a celebrated physician of Montpellier, is the next authority who has written on the disease, as he saw it in Languedoc.[1] The pest having been carried by Forez and Dauphiné into Velay and Vivarais, the Archbishop of Narbonne, fearing lest it should spread to mankind, sent Sauvages to inquire into its nature, and to suggest means for preventing or curing it. His description is as follows:—The symptoms were nausea, loss of appetite, and no desire to drink. Some of the cattle about the third day refused water, or drank very little. There was an extreme degree of uneasiness or heaviness, which made the affected beasts hang their heads and look troubled. But on the third day they wandered about here and there, as if to get out of their stables, and seemed pleased when allowed to go at large. When they were prostrated by the malady, they lay down from lassitude, and often got up again. The cow-men said that this disease made the cattle imbecile. Nearly all of them had shiverings over the body, but especially at the flanks and thighs. The hair was upright from the head to the croup. The roots of the horns were cold, but the rest of the body was of a natural temperature. The eyes were tearful, and at last purulent, and the effusion from them traced a furrow over the skin, from the eyes to the nose. There were worms between the eyes and the eyelids, but the cow-herds assured him that these had been observed long before the disease appeared. The nose was purulent, and as if suffering from glanders, the discharge being often mixed with blood. This was supposed to come from the mucous glands; the saliva was abundant, and streaming to the ground; the tongue whitish, and without pustules. The stench from the stomach was insupportable when the animals breathed. The

[1] *M. de Sauvages.* Mémoire sur la Maladie Epid. des Bœufs du Vivarais. Montpellier, 20 Decembre, 1746.

breathing was very uneasy, especially about the third day. The diseased beast sighed, and breathed with a noise which could be heard twenty paces off. When the flank was watched, it was found that the respirations were jerking. The sort of vertigo which sometimes caused the animals to run about, and which was observed by Lancisi in 1711, was also observed by Sauvages. The most constant symptom was the purging, which began between the second and fifth day. It was preceded by straining, and very often the matters were ejected for some distance, and were of a deep green colour with a very bad odour. This odour did not prevent other cattle from seeking and sniffing the fæces of the diseased, and dogs and pigs licked them up when permitted. This diarrhœa was, about the fifth or sixth day, mixed with blood, and on the surface looked like thick oil enclosing bubbles of air. This flux generally carried the animals off in the first week. Entire stables have been depopulated the same day on which the malady has appeared.

The unfavourable symptoms were: an invincible loathing, a copious discharge from the nostrils, and, above all, the diarrhœa largely mixed with blood, or even simple diarrhœa. The favourable symptoms were: the disease continuing till the second week; the animal eating and drinking a little, and the skin of the nose peeling off, or the hair of the croup being shed, and pustules in the mouth. If an abscess appeared in the dewlap or on the limbs, it was accompanied by another symptom: the dorsal spine became so sensitive, that a little pressure with the hand would make the beast fall on its knees, and if more forcible make it run away. Emphysematous swellings, very painful and diffuse, but not much elevated, formed at the flanks and thighs; these discharged a quantity of air when incised. When these swellings occupied the genital regions the prognosis was unfavourable.

There was not much derangement noticed in the viscera of those animals which were examined after death, especially if the disease had lasted for three or four days only. There was nothing carbuncular about them. That which passed for anthrax (*charbon*) was marked by great emphysematous swellings. True anthrax had not manifested itself in a single ox during this epizoöty, neither had it been seen for three or four years. The

rumen was filled with a great quantity of stinking, yellowish, and very dry food; and the second, but above all the third, compartment contained the driest matter, which was of a dark colour and like a cake. The lining membrane was livid, but this lividity was not accompanied by any softening which could be construed as marking gangrene. The fourth compartment, with its velvety lining membrane, was of a rose colour and slightly inflamed; and from thence to the rectum the contents were liquid and tinted from green to black. Livid stains were observed in the rectum. The gall-bladder was two or three times larger than in health. Nothing was observed in the spinal cord. The lungs were the organs most affected; for besides some redness of the lobes, their texture was sometimes so distended that they occupied after death the whole capacity of the chest. Air had filled up the interlobular space to such an extent that the veins were as large as the little finger. Microscopic examination of the blood did not show any insects. Nothing unhealthy was noticed in the brain.

This mortality amongst cattle, he says, had ravaged Europe for thirty-four years before it had got so far as Vivarais. Sauvages was one of those deputed to examine into the nature of the disease, and to propose means for its cure or prevention. It had depopulated in Aunonay more than forty-three parishes. One in particular had lost a hundred and thirty-four cattle in fifteen days. It was communicated from one cow to another. A butcher of Villeneuve de Berg had brought to Béage in Upper Vivarais some infected cattle, and these left the infection in the stables in which they had halted when on the road. Some of them died, but he slaughtered the remainder, and sold them as food to the inhabitants of Villeneuve. The dogs and pigs which had eaten portions of the carcases and the excrements were not affected, neither were the people who had eaten the flesh.

Sauvages solemnly assures us that it is useless to seek in vitiated pastures, in the air, or in stagnant water, for the causes of this epizoöty, when we see it spread step by step, but only amongst those animals which had communication with the diseased. Different seasons, or a diversity of climates, do not

appear to exercise much, if any, influence on it. The poison weakens the movement of the blood, as in scurvy and the plague. The disease itself has a great resemblance to the dysentery prevalent in camps, and which the soldiers acquire from the exhalations of latrines. In like manner cattle contract the disease by inhaling the stench from the excrements, healthy animals having a great tendency to smell these. The two affections present somewhat similar symptoms.

It followed from the observations of Sauvages, as had been already noticed by Lancisi, Ramazzini, and others, that eighteen animals died out of every twenty attacked; that there had been found no specific remedy to cure the epizoöty; and that the only means of guaranteeing the safety of the unaffected was not only to prevent the communication of the contagion from one beast to another, but also to hinder the approach of dogs which had been in infected neighbourhoods, and also the men who had been in charge of the diseased.

In Aunonay, as before mentioned, the disease had cleared out every parish; but in Vivarais, by the extreme precautions which the people took to prevent communication, not so many were destroyed, and it soon disappeared there. In Italy it was observed that the fat animals suffered most; in Vivarais this distinction was not observed, but a dozen oxen became affected very quickly, and the cows not for a month afterwards. In Dauphiné the disease was remarked to be latent for a month, but in Vivarais it showed itself on the day of communication.

The human plague does not attack animals, Sauvages remarks, neither does this of cattle extend beyond the bovine species; at least, he adds, I cannot altogether think that the disease actually raging amongst small animals in the neighbourhood of Lunel can be quite the same as that affecting the cattle.

A most notable circumstance observed by Sauvages at this time, however, was the fact of *goats and sheep* suffering from a disease very similar to, if not identical with, that of the cattle. Paulet remarks on this in the following words: 'Whether it was that the disease in cattle in France had passed by communication from these animals to others of a different species, or whether it

was that another special cause was in operation; certain it is that a malady accompanied by dysentery, and all the symptoms which characterize a putrid, pestilential, and exanthematous fever, such as that which had prevailed among horned cattle, was observed in Languedoc at the same time by M. de Sauvages[1] in the goats and sheep. The most favourable crisis for these animals was an eruption of small pustules about the nostrils and the other parts of the head, which became converted into scabs. As in the cattle, after death their lungs were found emphysematous, and their viscera bore the same marks of disease. It appears that these animals were treated in the same manner as the cattle, modifying, however, the doses of the remedies according to the age, the natural feebleness of the creature, and other circumstances. In general, the moiety of a dose of medicine suitable for an ox was that which sufficed for a sheep, if the remedy was not a violent one; when it was, a third, or even a fourth part was sufficient. M. Hastfer, in his "Instructions for the Improvement of Sheep," p. 154, strongly recommends a preservative powder for these animals, in all cases of pestilential or epizoötic diseases; it consists in taking two ounces of crude antimony, the same quantity of nitre, four ounces of sulphur and laurel berries, mixed with ten pounds of common salt. This mixture to be put in the mangers so that the sheep may lick it at pleasure.'[2]

Amongst the precautions taken by the States and the Parliament to arrest the spread of the infection, it was ordained that the dead should be interred in their skins; but they did not suspect the cupidity of the merchants, who purchased at a low price the hides which the farmers could smuggle away, and thus was a most important object frustrated.

Much that is interesting will be found in the Journal of the Marquis de Courtivron, some of whose observations have been already alluded to.[3] He saw the malady in Burgundy, Eastern France, in 1747.

Blondet[4] thought the disease was due to bad food and a low

[1] Nosologia Methodica, vol. v. p. 88. [2] *Paulet.* Op. cit., vol. i. p. 256.

[3] *De Courtivron.* Journal sur la Naissance, le Progrès, et la Terme de la Maladie du Gros Bétail à Is-sur-Tille, ville du Duché de Bourgogne. Paris, 1747.

[4] *Blondet.* Dissertation sur la Maladie Epidémique des Bestiaux. Paris, 1749.

temperature. The symptoms indicated by him have nothing worthy of remark. On opening the dead animals small tumours were found beneath the skin, and on the breast abscesses or large tumours like carbuncles. The skins of those which recovered were disfigured by a kind of miliary or scabby eruption. He named the disease an ardent, pestilential, eruptive fever.

Camper[1] reports an outbreak of the disease in 1768 and 1769 in the province of Gröningen, Holland; he imagined it to have become naturalized in the country, the same as small-pox in mankind. The symptoms are very accurately given; and from their perusal it is obvious that the lungs were somewhat severely implicated. The duration of the malady was from twenty-four hours to eleven days, though the last-named period was very rarely attained. In some cases the body was covered with spots, especially near the flanks, a symptom to which the peasantry gave the name of 'mange,' and which some of them regarded as a favourable prognostic. Camper, however, remarks that the buboes and the eruptions some have observed are uncertain characteristics. Nearly all cows in calf aborted. Passing over the *post-mortem* appearances of the abdominal viscera, which are remarkably well described, the respiratory apparatus is next examined. The lungs were found in a reddened, livid, inflammatory condition, flecked with purple spots, one lobe being usually more affected than the other; when incised, they were observed to contain black blood, which concealed their structure. In many instances air was found in the cellular tissue, between the lobules, which produced an emphysematous condition of the lungs. The lining membrane of the trachea was red, purple, and gangrenous, and this conduit was filled with a white frothy mucus, which extended to the bronchial tubes; this state accounted for the plaintive groans of the beasts. The fauces and back part of the throat was inflamed in all, but most in those which had the air-passages choked with mucus. The nasal apertures and the tongue showed sometimes traces of inflammation. In its nature the malady was thought to be a contagious putrid fever, which caused a great inflammation in the viscera of the chest and abdomen, the

[1] *P. Camper.* Leçons sur l'Epizoötie qui règna dans la Province de Gröningen en 1769. Paris, 1803.

throat, the tongue and nostrils, and at times even the brain. The third compartment of the stomach was always particularly affected. The disease never varied in its character in attacking one part of the animal more than another, and it was always accompanied by very great prostration of strength. It differed from the measles and small-pox of man, and Camper asserted that it should always be treated as a putrid fever. It was not a simple inflammatory fever; if it were, soothing remedies would be salutary. Bleeding was always injurious. A singular circumstance noted, was that cattle which had recovered were not again affected by it.

The only means of averting the contagion was to prohibit the introduction into the country of diseased or suspected cattle from those regions where the malady prevailed, as well as hay, straw, or other matters, and even men and animals.

Inoculation was extensively resorted to by Camper, and many able men have asserted that to the adoption of this remedy and the other experiments by which this physician undertook to cure the disease, Holland was longer in getting rid of the plague than any other country.[1]

It may be remarked that Engelman, in Holland in 1763, treats of the malady in a similar manner to Camper, and the fact that *sheep and goats* were liable to the contagion did not escape him; so that we have three observers at this period who mention such an occurrence. He says: 'It is not without danger that we allow sheep and goats to run about the contaminated stables or pastures, because these animals themselves can readily be affected, and at any rate the virulent element may attach itself to their wool and hair, and in this way be transmitted to the herds of cattle.'[2]

In Franche-Comté the disease was named *murie*[3] (murrain). Each writer designated it after his own ideas as to its nature.

[1] Some excellent letters on this invasion of Cattle Plague appeared in the French Newspapers during the progress of the disease. I would particularly recommend to the attention of the student those which were inserted in the *Mercure de France* for June, 1745, April, 1747, and at other times.

[2] *Engelman.* Verhandlung uitg. door de Holl. Maatsch. van Wetenschappen, 1763, p. 280.

[3] Registres de la Faculté de Paris, 1745.

Some thought and named it a malignant fever, or a pestilential and exanthematous fever; others as an ardent or eruptive fever;[1] and others again as a simple dysentery.[2]

There were so many points of resemblance between this malady and that of 1711 and 1714, that all those who compared them were unanimous in saying it was the same pest which had broken out anew, or had not ceased to ravage Europe and Asia, and had only been roused again by some cause to renewed fury.[3] Paulet, writing in 1775, remarks: 'If we attentively compare the symptoms one with another, we will find that the diagnosis, prognosis, the progress, and the crisis, are all nearly the same; there is the identical pestilential character, and the same unsuccessfulness in treatment. If there is little difficulty in pronouncing a certain judgment in this comparison, there is more in deciding affirmatively as to the identity of the symptoms of 1745. Although it is evident that the disease is the same, nevertheless we can distinguish many symptoms which were not equally apparent in all the places where the epizoöty was observed, either because each author has his particular manner of seeing and describing such things, or that the difference of climates and seasons has a real influence in modifying these symptoms. It is certain, for example, that the epizoöty in cattle observed in Denmark, Franche-Comté, Burgundy, and Paris presented nearly the same characters; while that of Holland and of Vivarais differed from these, and appeared to have a great resemblance between them. MM. de Sauvages and Leclerc scarcely mention a slight pustular eruption observed in the interior of the mouth and about the muzzle of the cattle; whereas all the other authors speak of a general eruption of pustules (*boutons*), which rendered the skin quite mangy, and on whose appearance were founded all hopes of a cure. The pestilential buboes in the groins and in the glands of the neck, which M. Clerc mentions, scarcely find a place in the descriptions of the other authors, unless we accept the natural or artificial depôts of which M. de Sauvages speaks. In this way we may say that the epizoöty

[1] *M. Blondet.* Dissert. sur la Maladie Epidémique des Bestiaux, p. 20.
[2] Nosologia Methodica Sauvagii, class ix. p. 89.
[3] Mém. de l'Académie de Berlin, 1768.

in Holland approaches nearest to that of Vivarais; and that the others resemble each other in a great many respects. It would be superfluous to seek the reason for this.

'There were two opinions with regard to the origin of the disease. Some people pretended, and especially the Danish physicians,[1] that after having taken its rise in Tartary, where it committed twice the damage of an ordinary plague, it at first penetrated Russia, from whence it extended on the one side into Poland, Livonia, the Duchy of Courland, Prussia, Pomerania, the Duchy of Mecklenburg, and Alsace, and afterwards passed to Holland and England; while towards the east, having penetrated Turkey, it spread into Bohemia, Hungary, Dalmatia, Austria, Moravia, Styria, and at length, by the Gulf of Venice, to Italy, Spain, and France, from whence it was carried to Germany, and finally to Denmark, where it was seen in 1745. But the opinion most generally entertained in Europe was, that after having broken out in Bohemia during the siege of Prague, it extended on the one side into Hungary, Bavaria, Styria, Carinthia, the Tyrol, Italy, and by the Alps into Provence; and on the other side it penetrated Alsace, Luxembourg, Franche-Comté, Lorraine, Flanders, the Low Countries, and Picardy, from whence it came to Paris, and from thence to many provinces of France. Whatever may have been its primary cause, it was generally attributed in Europe to nothing else than the use of rotten leaves of trees, which the cattle of Bohemia were compelled to eat during the siege of Prague, for lack of the forage which had all been taken possession of to feed the horses of the French army.' M. Paulet continues his summary of this malady to the following effect:—'There are few epizoötic diseases the symptoms of which have been described with so much care and sagacity. Writers of the highest merit, such as MM. de Sauvages, Chomel, Blondel, Le Clerc, and Randot, employed their pens in this work. Notwithstanding the rule that we imposed on ourselves not to deal in any hypothesis, we are unable to resist the temptation of citing two brilliant theories to which the disease has given rise, and which are capable of throwing much light on the treatment.

[1] Acta Havniens, vol. ii.

'On one side, it is said, a virus of a caustic, acrid, and inflammatory nature, received into the air and digestive passages, corrupts the juices and infects the chyle; this milky liquid, carried into the mass of the blood, can only reach it by passing through the principal channels which nature has destined for the lymph; these necessarily contract the taint, from whence the engorgement of the vessels which contain it, as well as the conglomerate glands, &c. If this virus is of a character to become thickened and consolidated, the engorgement augments, the lymph becomes depraved by its ceasing to flow, and irritates and inflames the tunics; when carried in this state into the mass of the blood it corrupts it; and from this arises the general depravation of the humours, and the swelling of the glands; a symptom which always indicates that the mass of the humours has received the leaven of contagion. If the action of the virus is limited to the digestive tract, it produces different symptoms throughout the whole of the intestinal canal, such as colic, spasmodic tensions, a contraction in the mouths of the lacteal vessels, diarrhœa, dysentery, &c., symptoms which are oftentimes observed at the commencement of the disease; and dead bodies have been opened in which all these viscera, with the exception of the third division of the stomach, have been found healthy; in this part the poison appeared to have concentrated its effects. In other subjects, no sensible alteration was found save excessive distension of the gall-bladder. But this often sufficed to produce death; a circumstance which proves the malignity and the subtilty of the contagious ferment, which was capable of destroying vitality, even before it perceptibly infected the humours. All observers agreed that its deleterious action on the nerves, and on their origin, was the first and the most dangerous effect it produced in the animal economy; it is that which is always the characteristic of the most dreaded diseases of men and animals, and which often decides their nature.

'On the other side, according to Boerhaave's theory of inflammation, it was admitted that the indirect as well as immediate cause of the disease was the arrest and stagnation of the blood in the extreme capillaries of the vessels, followed by sudden inflammation and rapid gangrene. The blood engorging

the extremities of the arteries caused their contractions to become augmented by reason of the obstacle opposed to the circulation, then the lymphatic vessels became dilated, and received the red portion of the blood; this blood, thus conveyed into vessels having an extremely delicate texture, stagnated, dilated them, and caused a true inflammation. If this inflammatory condition is not promptly remedied the circulation becomes more embarrassed, the principal viscera are involved, and particularly those which have a thin and delicate texture, which causes them to give way more easily to the impulsion, and to the disturbance of the fluids. The digestion being troubled and deranged, only furnishes imperfect chyle, that, mixing with the blood, augments still more the depraved condition of that liquid. The humours, in becoming stagnated, contract a putrid fermentation. In this state of universal engorgement, all the functions languish; the glands no longer separate their customary secretions from the mass of the fluids, and become swollen; the liver secretes an excessively acrimonious bile, a part of which is retained in the gall-bladder in consequence of the inflammatory engorgement of the biliary canal, while the remainder enters the blood, but only to augment the heat and burning. The inflamed intestines are so irritated that their capillary vessels are ruptured, and permit the blood to escape, which thus constitutes a true dysentery.

'M. Randot[1] especially patronized this theory, which he thought he had verified in the results of his examinations of dead cattle. In these he always found traces of inflammation, suppuration, or gangrene; and he sought to prove that a general inflammatory condition being the most constant in these animals, which always died of inflammation or its degenerate stage—gangrene, the principles of treatment should be solely directed to remedying this state. This author differed from De Sauvages on the prognosis founded on the presence of diarrhœa; that physician declaring that a simple purging, once established, was always unfavourable; whereas Randot pretended to have observed the contrary result; but he acknowledged that the dysenteric flux was always mortal.

'The symptoms having been explained in so clear a manner,

[1] *Randot.* Dissertation sur la Maladie Epid. des Bestiaux. Dijon, 1745.

there was no want of modes of treatment founded on the best principles. But unfortunately, in order to combat with advantage a disease the effects of which were so rapid and so dangerous, and the care of which was chiefly confided to the country people, who were but little adapted to receive these truths, there was not always the time nor the power to follow these indications. In France nothing was neglected which was likely to preserve such useful animals. The Faculty of Montpellier having been consulted on this subject, and having before them the report of M. de Sauvages, gave it as their opinion that it was best to ward off the attack of the malady by preservative remedies before it declared itself, than by curative measures when it had already involved the vital principles. To this effect, they wisely concluded it was necessary to treat healthy cattle which had cohabited with the diseased as if they were already infected. "We must begin, then, to separate the healthy from the unhealthy. Every day they ought to be cleaned and wisped, and not allowed to stand in the humidity of their excrement, as was allowed in Vivarais. Every day their litter should be changed frequently, and the stables ought to be perfumed by burning in them juniper-wood, laurel, and odoriferous herbs, but above all, by throwing vinegar on a red-hot shovel, &c." . . . . . Notwithstanding all the remedies proposed and tried, M. de Sauvages came to the conclusion that no specific could be found, no certain remedy could be discovered for this disease, and that out of every twenty infected cattle nineteen would die.'[1]

From 1750 to 1769, the pestilence was not so deadly nor so generally diffused over Europe, and the afflicted countries began to recover from its terrific effects; but towards the termination of this interval, it re-assumed its former virulency and mortality, as it spread far and wide over the old, as well as comparatively new, tracts of territory. This resuscitation, however, will be referred to hereafter; in the mean time we may, I think, accept as worthy of credence the conclusion arrived at by a competent authority, to the effect that, from 1711 to 1769, this awful scourge could not have destroyed less than 200,000,000 head of cattle in the various countries to which it had been carried.

[1] *Paulet.* Op. cit.

CHAPTER VII.

PERIOD FROM A.D. 1746 TO 1774.

A.D. 1746. In Beauvais, sheep small-pox did great mischief among the flocks.[1] The two following years were very dry, and locusts were causing considerable damage to the crops in Poland, Silesia, and Brandenburg, extending their ravages even as far north as Sweden. In 1749, these creatures were so numerous as to stop the army of Charles XII. of Sweden, which was then retreating in Bessarabia after the disastrous battle at Pultowa.[2] Every country was desolated by them, and Europe suffered severely. In England, in 1748, they were observed in considerable numbers all over the land, 'but providentially they soon perished with propagating. These were evidently stragglers from the vast swarms which did such infinite damage in Wallachia, Moldavia, Hungary, and Poland.'[3]

Rutty noticed their arrival in Ireland, where, he tells us, 'In May several inflammations and abscesses in ears occurred, and chincoughs were very epidemic among the children. There was also among the horses an epidemical cough, which proved fatal to them.'[4]

A.D. 1747. Rot in sheep in England, after a wet spring suc-

[1] *Barbaret.* Maladies Epizoötiques, p. 16. For a detailed and very interesting account see also *Paulet.* Op. cit., vol. i. p. 267.
[2] *L. Figuier.* Les Insectes, p. 366. [3] *Kirby and Spence.* Entomology.
[4] *Rutty.* Op. cit.

ceeding a very mild winter. The rain began to fall at the beginning of May, and continued, with but few intermissions, throughout the month, as well as in June and part of July. 'From all which, I would observe to my readers, that a midsummer rot ensued, and great numbers of Vale (Aylesbury) sheep became tainted by it, as did many also in the Middlesex grounds.'[1]

A.D. 1748. The summer was intensely hot, and the thermometer was higher in Paris than it had been for a hundred years previously. 'Some horses dropped down dead by means of the violent heat.'[2]

A.D. 1749-53. These years were remarkable for the great prevalence of disease affecting the animal and vegetable kingdoms. For 1749, Rutty observes: 'There was no rot among the sheep, notwithstanding a like wet winter and cold spring succeeding (as in 1735); so that it should seem that wet seasons, though they may promote, do not, for the most part, generate this disorder, but that it is owing to some latent causes.'[3]

A physician at Caillan, in the Gulf of Forez, says of the year 1750: 'The majority of vegetables and of animals have participated equally in the unseasonable weather; the leaves of the trees have faded and become yellow before the autumn set in; those of the mulberry trees were stained by black patches, which proved a real poison to the silkworms, these nearly all dying. The wheat crop was an utter failure because of the blight of rust, which, fastening itself on the stalk, completely withered it before the grain was ripe. Fruits were very dangerous to those who did not eat them with discretion; and the greater portion of the flocks died from a disease of an equally putrid nature as that which affected all things.'[4]

At Toulouse the seasons presented the same unfavourable character, and silkworms perished in great quantities. 'Sheep have been attacked in the months of January, February, April, and November, with a disease which is named *Picotte* (*variola ovina*). Many of them, especially those attacked in the month of January, died.'[5]

[1] Shepherd's Sure Guide. London, 1749. [2] *Rutty.* Op. cit. [3] Ibid.
[4] *Darluc.* Journal de Médecine de Vandermonde, vol. viii. p. 56.
[5] *Marcorelle.* Mém. de l'Academie des Sciences, vol. ii. p. 622.

Schnurrer, for 1754, writes: 'The diseases in corn, which had been observed in the few past years, were now also noticed in Switzerland. There was seen on the ears a grey and rough substance, from which a yellow-coloured sap exuded; this blackened the whole plant within eight days.'[1] A very extensive epidemy of ergotism prevailed in France, nearly approaching in its ravages those of the Middle Ages. It began at Sologne, its traditional birth-place, and spread through the Llandes, Flanders, and Artois. The ergot was so abundant that it formed one-third of the rye. The animals fed on it contracted the same gangrenous diseases as afflicted the human species.[2]

For 1752 it is recorded: 'In our time, the year 1752, there was observed a plague among fowls here at Vienna, by which an immense number were destroyed.'[3]

Epizoötic anthrax was prevalent in Switzerland, coincidently with gangrenous sore-throat[4] and malignant pustule[5] in mankind; and epidemic diseases, such as small-pox, scarlatina, and anginas were common in the human species.

A.D. 1750. In Ireland the spring was dry and backwards. 'Summer, except a few excessively hot days, cold, moist, and winter-like,' but some days in June were the 'hottest in the memory of man.' The same was recorded of July, when Fahrenheit's thermometer, as on the former occasion, rose to 76°. A memorable fall of snow occurred on the 23rd of October. November cold. 'About the middle or latter end of December, the most epidemic and universally-spreading disease among horses that any one living remembered, made its appearance in Dublin, which seems to have been nearly analogous to the influenza and catarrhal fever which seized mankind in the years 1737 and 1743, but now particularly attacked the horses in their turn, as may appear by a comparison of their respective histories. It had appeared in England in November, and spread through all England almost in an instant, and towards the end

[1] *Schnurrer.* Op. cit., vol. ii. p. 316.

[2] *Verheyen.* Dict. de Méd. &c., Vétérinaires.

[3] *Plenciz.* Opera Med. Phys., vol. i. p. 15.

[4] *Hecker.* Geschichte d. Neuern Heilkunde, p. 259.

[5] *Langhans.* Beschreibung Versch. merkwürdigk. d. Siementhals. Zürich, 1753.

of the month began to abate. It raged in Denmark at the same time, but it did not reach our horses in Dublin till its decline in England at the time before-mentioned, having probably been imported, and was nearly of the same duration here as in England; however, it affected the horses in Munster and Ulster almost, if not quite, as soon as in Dublin, and there was scarce an instance of a horse in town or country but had it.' It seized the animals 'like a violent cold, with heaviness, loss of appetite, cough, and laborious breathing, and then a profuse running at the nose and mouth of a digested, or thick, yellow, greenish matter, upon which they grew better. In England, as well as here, it did not prove very mortal, though some died of it. The death of our horses in the city was imputed rather to the use of medicines and too high a diet, than to any malignity in the disease; for it was observable that very few died in the country, and, particularly, none that were kept at grass. It vanished about the middle of January, 1751.'[1]

Osmer,[2] who wrote a treatise on the diseases of the horse shortly after this period, alludes to the epizoöty of 1750. 'Various were the symptoms, and different the degrees of illness amongst different horses. Some had a discharge of matter from their eyes, nose, and mouth; others had none; but in all there were great tokens of inflammation, attended with a fever and a violent cough. . . . Most of those horses which had a plentiful discharge of matter from the nose, &c., lived; and where such discharges did not happen, nor a critical abscess fall on some part, most of them in London died. . . . On many of these I made several incisions in the skin, on various parts of the body; and wherever an incision was made, I found in all of them a quantity of extravasated serum lodged between the skin and the membranes. . . . Since the year 1750, this disease has visited by turns each shed and stable, has fallen on horses of all ages at various seasons of the year, and in different shapes; wherever it comes I believe none escape; and when it falls on sucking foals, they are generally stunted and spoiled.'

[1] *Rutty.* Op. cit.

[2] A Treatise on the Diseases and Lameness of Horses, 3rd edit. London, 1766.

In a later edition (the 5th), he devotes much care in describing the 'malignant fever and epidemy,' or 'distemper,' among horses. He says: 'From the close observations I have possessed the means of making on the various *diseases* of horses for many years, and taking into consideration the nature, sameness, and simplicity of their *food*, I was long inclined to think that horses were not subject to *malignant disorders* as men are; but the epidemical disease that has occasionally raged amongst them for several years, and which still shows itself at short intervals, has taught me the contrary. For I notice, in this disease which, I own, is *new* to me, since the publication of my *second edition*, that the horses so seized are attacked with a variety of symptoms that require each a very different treatment from every other. The symptoms: The commencement of the disease is marked by great debility of the limbs, so much so in some cases, that the weakened patients reel and stagger about when led along, and that almost as soon as they are taken ill. Loss of appetite comes on generally with a short dry cough; the eyes become suddenly dim and glazed, and lifeless; they are also particularly free from all inclination to drink. Besides those general symptoms of the distemper, some of which prevail more than the others, that are otherwise indicative of the disease having fixed on particular parts of the animal, I shall endeavour to distinguish them as near as I can for the reader's further guidance when this distemper again makes its appearance among us. *First.*—Besides the symptoms already described, some horses are seized with *coldness of the external parts*, are chiefly affected with a weakness behind, but have no fever or other tokens of inflammation: there seems to be a tendency towards a general stagnation of the *fluids*. *Second.*—In this class are great tokens of inflammation, the fever is high, and the external parts are hot and burning; the sight is affected, and the head generally so. *Third.*—The disease falls mostly on the throat in the third species of attack, with manifest tokens of *great soreness* there. These seldom have any feverish heat, are not so much affected in their limbs or sight as those of the *first* and *second* classes; their appetite and inclination to eat, also, seems better than in these two classes. Before this *soreness* goes off, however, the patients become miserably re-

duced, though this falling away ought not to be imputed solely to their fasting, because all horses in this disease that are attacked severely, are thereby reduced, in a very few days, almost to the degree and leanness of a *dog-horse*. *Fourth class*, or the mild attack.—These are seized at first with a *cough* only, and show little or no symptoms of illness, nor of any unusual heat or cold, in general a discharge of a *serous fluid* from the nostrils comes on, as in the inflammatory fever. As the patients of this class are the least affected, so they recover soonest of any, and that, too, with little or no assistance. *Fifth*.—Along with the *cough* of the last description, some are troubled with a phlegmon or boil on some part of the head or body. In such cases, if the heat of the patient's body and strength be sufficient, the *tumour* comes on to ripeness, when its bursting, or being let out with a lancet, is *critically* a cure of the disorder. But in some poor creatures, whose system may be in a low state, the vital heat is so little that their lives are manifestly endangered before the tumour can be brought to a head sufficient to open by the usual assistance of poultices and cherishing diet. *Vital heat*, however, upon which depends the spontaneous termination of a large class of distempered horses, deserves a moment's consideration here, inasmuch as the different progress of the *critical boil* or tumour in different horses, is owing to *difference of their fluids*, and the more brisk or languid circulation thereof, as they happen to be more or less viscid. If this be not the true cause, I beg to ask from whence should arise the two extreme sensations of cold and heat in different horses affected with the same epidemical disease in the same stable, and, of course, under the same management? It may also be here instructively remarked, that those horses are most affected with cold and shivering (the presage of death) in whose blood is found the least proportion of serum.'[1]

A.D. 1751. In Ireland, about December, 'there prevailed again among the horses an epidemic catarrh, being attended with a running at the eyes and heaviness, with a tumour of the head, limbs, and sometimes scrotum, not so general as last year, though some few died.'[2] The spring had been stormy and cold; sum-

[1] *W. Osmer*. A Treatise on Horses, 5th edit., p. 103. [2] *Rutty*. Op. cit.

mer wet, except some days in June. 'The bad weather in July and August was common to us and England and Germany.'[1] Autumn variable; winter open and foggy.

A.D. 1752. In Ireland, 'spring cold and dry, except a moist May. Summer extremely wet, the herbs were remarkably larger than usual, from the excessive moisture of the season. Several of the grains were lean and poor, but the potatoes were good. A rot appeared among the sheep at the latter end of the season, and became general in the low and moist lands through most parts of the kingdom.'[2]

A.D. 1753. In Ireland the weather had been very wet, and caused great destruction of sheep throughout the island.

A.D. 1754. In this year glossanthrax, or a form of gangrenous sore-throat, presented itself as an epizoöty among animals in Hanover. 'In the year 1754, during the winter, the sheep and swine, and also the geese and ducks, were attacked by disease and died. Their flesh was found black and loosened from the bones. The intensity of the cold, which only lasted for two days, was, by some people, blamed for this; others, however, blame the grass of the previous year, which the geese ate equally with the cows, and the latter died in great numbers at that time. The ducks certainly ate little grass, and perhaps in their case the cold was the immediate cause.'[3] In Manilla, there was a severe eruption of the volcano of Taal, accompanied by an earthquake, which inflicted an immense amount of damage. The whole country was enveloped in darkness, and there fell alternately quantities of water and showers of calcined matter, which destroyed plants and trees. Animals suffered greatly, and it was reported that the monkeys which were not destroyed took refuge in the villages.[4]

A.D. 1755. Earthquakes in various parts of the world. In Peru, the city of Quito was destroyed in April. In May, the islands of Mitylene and Madeira were much damaged, and in November the great earthquake at Lisbon took place, the

[1] *Rutty.* Op. cit. [2] Ibid.

[3] Hannöv. Gen. Anzeig., 1754, also *Fischer.* Liefländisches Landwirthschaftsbuch, p. 625.

[4] *Haussmann.* Voyage en Chine, &c., vol. ii. p. 251.

distant effects of which were perceived five thousand miles away. In December other shocks were felt, and in the following January these were repeated.[1] From 1754 to 1757 locusts swarmed in Portugal and Spain. There appears to have been an epizoöty among horses in Austria. 'A plague here, in Austria, amongst horses, but particularly at Vienna, increased during this year. It was a kind of suffocative catarrh and inflammation of the lungs, and killed a prodigious number of horses.'[2] In this and the following year, a cattle epizoöty was prevailing in Croatia and Krain.[3] From the month of May until the month of September 'ekzema epizoötica,' or aphthous fever, was present amongst all the domestic animals in Franconia. 'For several months—July, August, and September—an epizoöty raged among the cattle in Bamberg, Nuremburg, and their neighbourhoods. To all appearance it was not infectious. The exciting causes appeared to be general, each animal being attacked independently. This malady not only affected horned cattle, but also horses, swine, and sheep. This was specially remarkable: the feet of the affected animals became swollen, and the hoofs sloughed off. The feathered tribe was not free from this malady; the turkeys had their feet so diseased that they could not walk; they were obliged to crawl on the backs of their legs. By the use of soothing remedies, the feet which were before deformed and sore, so far recovered that these creatures began to walk; they regained the flesh which they had lost while so crippled, notwithstanding their feeding with undiminished appetites.'[4] There is another description of this disease. 'The first marked symptom in the affected beast was a lameness or halting in the fore or hind feet, and on examining these the hoofs were, so to speak, under-run by matter, ulcerated, hot, and swollen. The same appearances were observed in the mouth, both sides being covered with vesicles which became confluent, and left them swollen and ulcerated. The tongue was covered with what seemed to be a large blister. Besides these symptoms, there was marked internal fever, a great

[1] *Plencis.* De Terræ Motu. Vienna, 1762.
[2] Ibid. Opp. Phys. Med., vol. i. p. 15. De Contagio ad finem vergente.
[3] *Bottani.* Op. cit., vol. vii. pp. 8, 9. [4] Fränkische Sammlungen, vol. i. p. 349.

inclination to drink frequently, and profuse salivation. The lameness and the other symptoms disappeared as the contents of the vesicles was discharged, and the ulcerated surface had grown healthy. Where the disease became more virulent, there also appeared on the udders of some cows vesicles and abscesses, and these animals recovered more slowly than the ones which had been less severely attacked in the feet and mouth. The most favourable circumstance connected with this disease lay in the fact that no animals died from it.'[1] From the same source, we learn that the inflammatory symptoms were more urgent than usual, pigs in particular suffering severely, and frequently losing their hoofs.[2]

At Bâle, in Switzerland, sheep small-pox was prevalent. 'From autumn until winter a pestilential disease of sheep increased in the village of Reichen. By inoculation, such as is practised as a prophylactic in the small-pox of the human species, a flock much exposed to the contagion could be rescued from danger and destruction.'[3]

This is the first time, I think, that we have a notice of inoculation being employed to mitigate the effects of ovine small-pox. Gasparin,[4] however, writing in 1821, remarks: 'In Languedoc, where this malady is common, the people have resorted to inoculation from time immemorial, to prevent extensive epizoöties. To this end, in September of every year, when the hot weather is nearly over, and the temperature is most favourable for the purpose, they take the skin of a sheep that has died from small-pox, and hang it in the sheep-fold. All the year's lambs, already six or eight months old, and in a condition to withstand the disease, acquire it by rubbing themselves against this skin; and by this means the whole flock is insured from the malady in future.

It may here be noted, that the value of inoculation was at a later period frequently and carefully tested. Venel, Professor of Medicine at Montpellier, Chrétien, Thorel,[5] Tessier,[6] Coste, and

[1] *Hoffmann.* Fränkische Sammlungen, vol. i. p. 384. [2] *Reuss.* Ibid. p. 462.
[3] *Zuinger.* Acta Helvetica, vol. iii. p. 301.
[4] *Gasparin.* Des Maladies Contagieuses des Bêtes à Laine.
[5] Avis au Peuple sur le Claveau. [6] Mém. de la Soc. de Médecine, 1786.

Lullin,[1] had given their attention to it in the eighteenth century; and Chaptal, Pessina, Holmaister,[2] Barbançois,[3] Voison, Guerineau,[4] and Grognier,[5] in the beginning of the nineteenth century, had fully demonstrated the usefulness of this practice in certain circumstances. When vaccination was introduced as a preventive of human small-pox, the resemblance between the two diseases led many experimenters to try its effects on sheep. Godine the Younger,[6] and Husson,[7] Gohier,[8] Brugnone,[9] Valois,[10] and Chancey,[11] all conducted careful experiments which decisively proved the inutility of this operation as a prophylactic measure.

A.D. 1756. Anthrax declared itself over a large extent of Europe. The winter had been mild, and the spring and summer very dry and hot. In June heavy storms had been frequent. 'About the middle of the past June (in Franconia) it was reported from Culmbach, that in that neighbourhood a disease had appeared among the game, and also extended to horned cattle. The accounts which soon after were sent in by the local medical men, conveyed the information that the cattle sickened suddenly in the pastures; in some, tumours appeared in the feet, flank, neck, and breast, and spread rapidly; in others, however, swellings upon the head manifested themselves, and these died in six or eight hours; the others died in from twenty-four to thirty-six hours. The game, horses, and swine had all the same disease. Although the malady had rapidly destroyed the stock, yet one could not say with certainty whether it was contagious or not.'[12] 'It was not alone the game, such as deer, roes, wild boars, or hares that died, but four hundred of the larger venison were found, some in ditches, others in corn-fields, and some in spinnies. I have

[1] Bibl. Britann. *art.* 'Sciences,' vol. ix. p. 398.
[2] Ibid. vol. xlv. p. 189. [3] Annales d'Agriculture, vol. xlvi. p. 187.
[4] Ibid. p. 193. [5] Ibid. p. 319.
[6] Bibl. Britann. vol. viii. p. 204, *art.* 'Agriculture.'
[7] Annales d'Agriculture, vol. xxi. p. 73, "Rapport de la Soc. Centrale de Vaccine, 1811.'
[8] Mémoire sur la Vaccination, p. 94. 'Mémoires,' vol. i. p. 40.
[9] Memoria della Soc. Agraria di Torino, 1812.
[10] Annales d'Agriculture, vol. iii. p. 60.
[11] Bibl. Britann. *art.* 'Agriculture,' vol. x. p. 216.
[12] *Wagner.* Fränk. Samml., ii. p. 102.

myself opened one of these dead roes, and found nothing very particular besides a swelling in the left hind foot or leg. These animals had been known to bellow loudly and go away from the forests, seeking ditches and morasses, where they lay down and remained from sheer exhaustion. With the wild boars this was a common occurrence, and fourteen have been found dead in one place. The hares were stricken by the pest in the midst of their course, and fell and died. Horses had the same symptoms as the horned stock, the swellings appearing upon the thighs and flanks, the breast and the head. The disease has gradually disappeared, and for five days (on the 21st July) we have not heard of any loss among the cattle.'[1] This author speaks of a carbuncle in a peasant. Another writer mentions what he considers to be the causes of this epizoöty. 'To my knowledge, the causes of the disease may be ascribed to the perturbations in the physical world. Immediately after the first thunderstorm and the succeeding rain, of which there had been a dearth for some weeks, this plague very generally declined, and at last disappeared. . . . . The said disease spread itself from Culmbach to Coburg, but did not visit all the villages. From Coburg I am credibly informed that a person there was attacked on the forehead by a large tumour or carbuncle, and his life was barely saved by the immediate opening of the swelling.' Many people were affected, and some authorities thought the malady was originated by the bites of insects.[2]

At Suhl, in the forest of Thuringia, it also caused much destruction among wild and domestieated animals.[3]

The Cattle Plague appears to have been introduced into Eichsfeld this year, if we may judge by the following account. 'The second misfortune for the burghers was in 1756, when a destructive cattle plague (*eine starke Viehseuche*) broke out, by which most of them lost their cows. There were some who lost from ten to a dozen head. The homebred cattle were infected by beasts from Friesland which the people are accustomed to purchase in the autumn. It raged until Christmas; and to

[1] *Wagner.* Op. cit., p. 111.
[2] *Schmiedel.* Act. Phys. Med. Colleg. Onold. Onolzbach, 1754.
[3] *Glaser.* Die Knotenkrankheiten, p. 10.

prevent its spread, all infected cattle or those which were suspected, were killed immediately and deeply buried.'[1]

Sheep small-pox was prevalent in Saxony. It was noted as a curious circumstance, that a flock affected with the disease was turned into a garden and kept there to prevent the contagion from reaching other flocks; in this garden grew a quantity of pepper plants (*capsicum Indicum*), and the diseased sheep feeding on these, all recovered.[2]

In the island of Minorca, in the Mediterranean, an epizoöty appeared among the cattle, which caused much loss. Large numbers of cows and oxen had been carried thither from Auvergne, in France, and landed in the burning months of July and August. Obliged to drink tepid brackish water, these animals fell into a languid and feeble state, and became rapidly emaciated; their breath felt hot, and they had sanguinary emissions with their urine. When their bodies were opened, nearly all the viscera of the abdomen were found in a state of inflammation or gangrene. The majority of the shepherds who had charge of these herds were sick; but those who had the imprudence to eat the flesh of the diseased animals were attacked by a malignant fever, accompanied by gangrene, which manifested itself on the second day at the elbows and heels.[3]

A.D. 1757. A long and cold winter, succeeded by a wet spring, abruptly ushered in an unusually hot summer. An earthquake was felt in the island of Malta. Dysentery and putrid fevers were very common in mankind in many countries. In this year a small beetle, named the 'Bostrichos typographicus,' made its appearance in the Hartz forests, and it is calculated that, up to 1783, it destroyed a million and a half of trees—a destruction of timber which nearly ruined all the inhabitants. Cold damp seasons setting in, however, these insects were soon all swept away.[4]

In Saxony, in this and the two following years, ovine small-pox was yet very common and fatal; loss of the eyes

[1] *J. Wolf.* Geschichte u. Beschreib. der Stadt Duderstadt, p. 207.
[2] *Paulet.* Op. cit., p. 289.
[3] *Barberet.* Mémoire sur les Malad. Epizoötiques, p. 27.
[4] *Latreille.* Nat. Hist., ch. xi.

and the lips from gangrene were quite frequent concomitants.[1] According to Camper,[2] the French army operating in Westphalia introduced the Cattle Plague to Minden. A very peculiar carbuncular epizoöty appeared in France, in the province of Brie, at the end of the summer and commencement of the autumn, among horses, cattle, deer, asses, hogs, dogs, and fowls, and even in fish.[3] The malady appears to have arisen in the marshy forest of Crecy, and to have raged in its vicinity to such an extent that, from the 15th of June to the 31st of July, 490 animals were attacked, of which 290 (162 horses, 80 oxen, 38 asses) died. Many flocks of sheep perished in various cantons of Brie. Human beings were also affected by the disease being transmitted to them.

In some places asses, in others horses, and in others, again, only cattle were affected. At one place the reporter, M. de Chaignebrun, observed that bulls were more commonly affected than cows; and that usually in the stables or cow-sheds where the people were not careful to separate the diseased from the unaffected, these became ill. The premonitory symptoms were a heaviness of the head, the eyes somewhat closed, heavy, and dull; pain and difficulty when at work, or in walking; suddenly stopping in progression; a particular way of turning the head; feebleness of the limbs; lassitude; a diminution of milk in cows; difficulty in breathing; the cessation, partial or complete, of rumination, &c. The disease when fully declared was marked by stupor; the eyes were extremely sunken, dull, purulent, and tearful; the ears more or less drooping, the head carried near the ground, and the body unsteady and sinking. They flexed the thighs; pawed, and appeared uneasy and in pain. The respiration was hurried; the flanks beat violently; they either lay down or attempted to do so; the beatings of the heart were loudly heard; some had symptoms of colic, moaned, and refused to eat their food. The most remarkable symptom, and that which characterized this disease in particular, was the form-

[1] *Fink.* Pockenkrankheit d. Schafe, p. 1.

[2] *Camper.* Von der Viehseuche, p. 67.

[3] *A. de Chaignebrun.* Relation d'une Maladie Epidémique et Contagieuse, &c. Paris, 1762.

ation of large swellings or tumours—two, three, four, five, or six, and even more—on different parts of the body. These tumours either adjoined each other, or communicated by a kind of cord. They ordinarily appeared on the throat, the neck, the breast, or the inferior parts of the chest and belly, the scrotum or sheath, or within the thighs. They also appeared about the eyes, the jaws, on the lips, the shoulders, the haunches, and on the sides of the chest and abdomen. They were more or less indolent, and so little endowed with sensibility that in handling them the animals exhibited no pain. The impression of the fingers remained on them for some time, and when they were opened a serous fluid, more or less abundant, and of a reddish yellow or bloody colour, escaped. The subcutaneous cellular tissue was spongy and distended with a yellow glairy matter resembling old and rancid lard. It was also sometimes of a pale red tint, similar to the feeble granulations of certain ulcers; and showed hydatids or small vesicles. The cellular tissue, and with it the adipose layers, were the textures chiefly affected, and after them the glands. This accounted for fat animals being more commonly attacked than lean ones, and for the tumours appearing so often in certain situations; it was not because the humour gravitated to the dependent parts, as the vulgar and the farriers supposed, but because the cellular tissue contained more fat, was more elastic, and less compact and resisting than other textures; this also explained the sudden formation of these tumours, as well as their metastasis from one part to another. After the excision of these swellings, the flesh, of a bright red colour at the time of extirpation, became in some days yellow, then dead livid, blue, or black, forming a large eschar without caustic. They were regarded as buboes if they attacked the glands, and as carbuncles when they appeared elsewhere. The blood drawn from the animals attacked, or even from those bled as a precautionary measure, bubbled more or less, and was thick and viscid; its colour varied much. The distress the animals manifested was very great; notwithstanding their violent throes, they yet seemed, by their agony, their moans, and their docility, to ask assistance. The majority of them indicated the seat of pain by turning their heads towards the affected side. Some of the attacked died all at once, or in less

than twenty-four hours. The result of numerous autopsies showed that in those which had been diseased in the breast and which had died, the greatest changes were found in the chest; that in those which during life had been affected on the exterior of the abdomen, about the generative organs, or inside the thighs, the interior of the abdomen exhibited these alterations more particularly; while in those animals which had succumbed, but in which no tumours had been visible, engorgements and effusions in different cavities were discovered. The author of this report very sensibly draws a distinction between this epizoöty and the Cattle Plague. The majority of the creatures affected by this malady did not cease eating or drinking until they were very ill, or nearly dead; usually there was no discharge from the mouth or nostrils, and these parts were in their natural condition; there was no diarrhœa nor dysentery; no fever was perceptible until the malady was far advanced and death near; sometimes the urine was high-coloured and bloody.

The causes of the epizoöty were supposed to be these: The winter of 1756 was boisterous and long; the spring of 1757 was very wet; and when the disease showed itself in the summer, the heat had been sudden and excessive, the water in the ponds warm, muddy, and corrupted. It manifested itself in the parishes nearest to the forest of Crecy; this forest is very marshy and full of insects. Saddle-horses were less exposed to attack than others. The hay and oats of 1756 were bad. The disease first showed itself among the animals depastured among the ponds, marshes, and stagnant waters in the forest, which was regarded as the primitive source of the pest. The real or exciting cause, however, was not so easily made out.

The remedial measures adopted do not offer anything worthy of notice. The preservative ones were those applicable to a contagious disease.

The same kind of malady which had reigned in Franconia the preceding year had disappeared very suddenly in this; nevertheless, this class of epizoöties appears to have been very frequent during the year. Esthonia and Livonia were so visited. 'In the middle of July, intelligence was received from the circle of Dorpat that there, as well as in the circle of Revel, a virulent disease

among horses had shown itself, and which in the Dorpat district alone had destroyed 1500 horses in the course of eleven weeks. After rain had fallen the malady ceased. What is more, about the beginning of August the cattle there began to suffer, and soon after we had tidings from the town of Riga, and from the district of Kirchholm, that a cattle plague had broken out there, but it differed from that of 1748.'[1]

Finland was also subjected to the ravages of a similar malady, though the reporter confounds the disease with *the* Cattle Plague; but the description of the symptoms, as well as the fact that many men were infected by the sick animals, shows this opinion to be erroneous. 'There died, apparently from the intolerable heat of the weather and from the dry summer, an incredible number of horses, and some cattle, especially around Tawastehuus, as also in the parishes of Janacala, Wånå, Huttula, and Sekmäke, where many hundred head perished in each. Here around Abo it was most severe amongst the cattle, particularly in the parishes of Vehmo and Virmo. The greater the drought and heat of the summer, so the more deadly was the malady. If the cattle were deprived of water in the fields where there was no shelter, and exposed to the heat of the sun, or kept on marshy pastures where the water was corrupted, and where their food was covered with mud or slime, then the plague was all the more dangerous. When healthy cattle were put on pasture where others had died and lay exposed or were improperly buried, they became stricken. It has been observed, that on those pastures which for some parts of the year are submerged, and have afterwards been dried up, the herbage is covered with mud; this is very obnoxious to health, and causes dysentery in the animals eating it. It is also well known what a stench meadow-caterpillars (*grasraupen*) cause, and they were very common here; besides, it is a matter of observation that myriads of vermin take up their abode in marshes and quagmires, which in long-continued drought are dried up and leave all these creatures to rot on their surface, and to taint the air as much as the stagnant water does. In addition to all this, such creatures as aphides and caterpillars, which so increase

[1] *Fischer.* Op. cit., p. 447.

in dry hot summers, exaggerate the general unhealthiness. This accounts for the plague not being in all places a contagious disease; for it was proved that cattle were not attacked where they had shelter, good pasture, and good water, of which this year in many places there was a great scarcity.'[1] It was most severe in July, the hottest month of the year.

The malady passed from Finland to Russia. Its contagious properties, in passing from one animal to another of the same species, were very marked; but still more so was the facility with which it could be transmitted to beings of quite a different species. Hartmann enters fully into details concerning cases in which men who had imprudently come in contact with the diseased beasts, or wore articles which contained the virus from them, were seriously affected.

A.D. 1758. In England the winter was very severe, and a comet was visible. A shock of earthquake was experienced in the Azores. On the Continent the winter was mild, and the summer damp in Germany and the South; in northern countries the same season was very hot. Mankind suffered from catarrhal and petechial fevers, and in France and Ireland from gangrenous sore-throat. According to Albrecht, in Coburg and Franconia an epizoöty of gastro-enteritis appeared in the bovine species, caused, it was surmised, by the bad quality of the forage.[2] The previous year a cattle epizoöty had appeared in Austria, and on the 26th of April this year glossanthrax was announced in Verona, from whence it soon spread. The Sanitary Council of Venice notices it as follows: 'This disease, which is always preceded by the formation of one or more vesicles at the internal orifice of the anus, demands the inculcation of the strictest attention on the part of the villagers, in order to avert fatal consequences, such as have followed its appearance in the Valley del Sole, Pieve di Ossana.' On the 22nd of June it had reached Genovesato. For the 16th of December it is noticed: 'The diffusion of the *carbone volante*, or "black disease" (*mal nero*), called

[1] *Hartmann.* Abhandlung die Kön Schwed. Akad., vol. xx. p. 47. A brief notice of this epizoöty and Hartmann's observations will be found in the *Annual Register* for 1761, p. 122.

[2] *Albrecht.* Nov. Act. Nat. Cur., vol. ii. p. 289.

also *morbino*, has extended to the district of Borgo Taro, on the borders of Parmegiano and Piacentino. Should there be observed at any time the slightest sign of lameness, or if the disease should manifest itself along with this symptom, it may be the more readily recognized by a swelling which soon spreads, and in the middle of which is discovered a tumour the size of a nut, soft to the touch, and disappears on pressure.' On the 29th of March, 1759, there is mention of its presence. 'A joint notice has been given to every town and village in the Valley of Telina, and latterly the district of Tirano, that there has manifested itself a disease similar to that of 1732, and which consists in vesicles or ulcers above and below the tongue of the cattle, and which malady is named *cancro volante* (or flying cancer), because of the velocity with which it travels from one region to another. Should it appear, with the help of Providence it may be made to pass lightly by; for if not able to prevent its attacks, we may at least, by judicious treatment, cure that which, if neglected, would produce the most sinister effects.'[1]

The reindeer in Lapland appear to have suffered from a kind of aphthous disease in the feet. 'The reindeer have at this time (July) suffered from a disease which is called "Slubbo," and which showed itself during the whole summer, but not so generally. The feet become enlarged, swollen, and suppurate. The disease is not in itself very deadly, but it is dangerous, inasmuch as the animals are so lame that they cannot escape from the destructive claws of the wolves.'[2]

But at this time, another more deadly pestilence appears to have decimated the herds of these most useful animals, and which there can be no doubt was the Cattle Plague, transmitted from the bovine to the cervine species, as that contagion was then raging in Sweden and Norway. The coincidence of the two diseases—ekzematous fever and Cattle Plague—as we will see hereafter, has been often observed. Among the Lapps, the Plague was named 'Radok tauta' or 'Radok maïne.' It spread over the whole south-western portion of the country, and caused such havoc, that many of the people, who previously were very

[1] *Bottani.* Op. cit., vol. iii. p. 12—14.
[2] *Weglius.* Abhandl. der Schwed. Akad., vol. xi. p. 226.

wealthy in possessing immense herds of these creatures, were reduced to extreme poverty. The writer who describes it was perfectly convinced that this reindeer plague was the same as that which attacked the cattle in 1750-51, and which came by infection from Norway to Jemtland. He gives the following account of it: 'The symptoms are—the head is drooping, the mouth feels dry, the horns are cold, and sometimes there is great shivering or nervous twitchings; the eyes are watery, and the tears flow; there is a watery mucus discharge from the nose; the saliva is viscid, profuse, and dribbling from the mouth, which is covered internally with dark-blue or black spots, and its whole lining membrane is of a dusky colour. The animals have constipation. When the disease has reached its height the eyes begin to suppurate, and the mucus is viscid, purulent, and foul-smelling, and sometimes tinged with blood; the mouth becomes perfectly black, with spots, bladders, and pimples, and the odour from it is very offensive; the breathing is slow and heavy, and the desire to eat and to ruminate is lost; they stand trembling upon their feet; the eyeballs become green, and the beasts stagger and drag themselves along the fields without eating or drinking; they cough and snort a good deal, until at last, after a few weeks, they die. On an examination of those which perish in this way, the throat, bowels, liver, and other viscera are found black and red-coloured, from gangrene. The lungs are observed to be wasted.'[1]

Its contagious properties were undoubted, and it sufficed to put a healthy reindeer in the harness of a diseased one, or to milk a female deer, yet unaffected, with the same hand which had milked a sick one, to produce the malady. Even those deer which happened to smell at the urine or the excrement of the infected were promptly attacked. It was then important, according to this author, to keep apart the healthy, and to burn around them juniper branches, taking care even to exclude the people who looked after the sick animals. It was also necessary to inter the dead in deep pits without skinning them, and to have these graves far from the roads pursued by reindeer yet unaffected.

[1] *Gissler.* Abhandl. der Schwed. Akad., vol. xxi. 286.

Influenza appeared in Stirlingshire, and in the north of Scotland, in the months of September and October, and horses seem to have been affected 'with a cold and a cough' at the onset of the attack in man.[1] Vast numbers of horses died during this year in London and neighbourhood, from an epizoöty.[2] Probably it was this 'influenza.'

It has been remarked that in these years the Cattle Plague was repeatedly imported into the Prussian States, but without becoming general.[3]

A.D. 1759. Three comets were seen this year, and an earthquake was reported, which was severely felt at Balbek, and destroyed Tripoli, in December. An epidemy in Peru, commencing in the same way and place as that of 1720. 'Dogs partook of the disorder, and they might be seen stretched in the streets without ability to stand on their feet; yet it was observed of them, as of well-constitutioned men, that though many suffered, few died.'[4]

From the 3rd of September of this year to the 9th of April, 1761, an epizoöty appeared amongst cattle in Austria, and gradually extended through the whole of the provinces of the State of Venice.[5] Heusinger thinks that it was in all probability a pulmonic affection.[6]

A.D. 1760. An eruption of Mount Vesuvius and an earthquake in Syria. The winter was extremely cold, especially in the north, and the summer was very hot and dry. Pestilence in mankind raged in Carthagena in the form of tertian fever. The Ottoman empire also suffered severely from plague. In the river Dive, in the department of Calvados, France, an epizoötic disease was observed amongst the fish. 'Since the year 1760, there have been observed two or three kinds of epizoötic diseases amongst the fish in the river Dive. The mortality has not been general, it is true; but besides those which have perished, the greater portion were sickly and weak, and floated on the surface of the

[1] *R. Whytt.* Medical Observations and Inquiries, vol. ii. p. 192.
[2] *Bascome.* Op. cit., p. 128.
[3] Beiträge z. Geschichte d. Viehs. in d. Mark. Brandenburg, p. 31.
[4] *Dr Unanue.* Sobre el Clima de Lima. Trans. Epid. Soc., vol. ii.
[5] *Bottani.* Op. cit., vol. iii. p. 21—64.
[6] *Heusinger.* Recherches, &c., vol. ii. p. 234.

water, where they were easily captured. Their gills were pale, and the flesh of those which were cut up was of the same colour. This epizoöty may have occurred oftener than once without attracting much attention. It was manifested at the end of the summer over a space of from four to five leagues from Hoffot, in Auge, to Froarn, and exclusively below that village; there were found dead salmon here and there, as well as pike, and the banks of the river were covered with plaice and other fish. It was easy to find the cause of this mortality in the bad quality of the water, which, after having lain stagnant in the neighbouring marshes, and having become corrupted, communicated its bad qualities to that in the river. For it is worthy of remark, that this diseased condition of the fish only takes place in those years when, in the month of August, there are abundant showers, and when the superabundance of water causes the Dive to overflow its banks. In addition to this, the surface of the adjoining prairies is very low, so that when they are flooded the plants growing on them become macerated, and the heat of the season adds to these circumstances a new intensity; it is not to be wondered at, then, that this putrid liquid should communicate to the waters of this river unhealthy qualities when it begins to flow back to its original channel, and render them so poisonous as to occasion the death of the fish.'[1]

In Switzerland, an epizoötic disease of a carbuncular nature appeared amongst cattle and horses, and which the people termed 'Louvet' or 'Lovet.' It caused much loss. Whenever an ox was seized with the disease it lost its strength, began to tremble and lie down, not seeking to rise but very rarely. The head was carried low, and the ears were pendulous; there was great dulness; the eyes were red and tearful; the skin hot and dry; respiration was quickened and difficult, accompanied with heaving at the flanks when the disease had made considerable progress; there was a frequent cough; the pulse accelerated and strong; the breath fetid; the tongue and the palate arid and in the latter stages black; the thirst considerable. Cessation of the appetite and of rumination: the urine scant, and when passed,

[1] *Adam; Chabert,* &c. Instructions and Observations, vol. iii. p. 331.

which was but seldom, it was reddish-coloured; the fæces were hard and black, though at the beginning they were sometimes liquid and bloody. Cows gave no milk. In many of the animals inflammatory tumours formed now on the chest, now on the udder and the generative organs, and at other times an eruption of boils accompanied by pustules appeared all over the body. It was rare to witness all these symptoms in the same subject, but the more numerous they were the greater was the danger. Usually recovery or death was decided by the fourth day. When this day was passed and the seventh reached, if the animal still looked cheerful it generally recovered, although the convalescent stage might not be arrived at before the fifteenth day. Then the urine, when retained in a vessel, was found to deposit a white sediment: the excrements were more abundant than in the natural state, softer and less fetid, the skin moist and relaxed; the tumours became filled with a white pus; the appetite returned, rumination was resumed, and depilation of the skin—all these were the happy signs of recovery. When the result was to be otherwise, the abdomen began to swell, the animal groaned loudly, the debility increased, tremblings set in, with convulsions; and there was retention of the urine, diarrhœa, and dysentery. On opening the dead bodies, there were found black tumours full of a yellow serosity, which effervesced with acids; the flesh was livid and approaching putrefaction; the lungs withered-looking and full of tubercles or small abscesses, particularly in beasts which had died on the fourth day; the stomach and the intestines were spotted by red patches and full of viscid mucus. Opening the tumours with a razor, and scarifying them around their margins, was the most advantageous local treatment.[1] In Caldiero, in Italy, an epizoöty of glossanthrax, or perhaps *ekzema epizoötica*.[2] The latter disease manifested itself in Upper Lausitz.[3]

In Cleveland, in the county of York, in the months of February and March, scarlatina, complicated sometimes with malignant sore-throat, was epidemical in the human species.

[1] *Regnier.* Paulet. Op. cit., vol. i. p. 228.
[2] *Bottani.* Op. cit., vol. iii. p. 38.
[3] *Rumpelt.* Op. cit., vol. i. p. 272.

At the same time an epizoöty manifested itself amongst horses, which affected, it is supposed, every animal in the locality, and with symptoms very similar to those observed in mankind. The malady only remained in the neighbourhood for from eight to ten days. It was remarkable for its brief duration, and for its not having extended beyond the district, according to Heusinger and Verheyen.

Its localization is, however, a mistake, for it appears it was wide-spread. For instance, it was prevalent and very fatal among horses in London in January, as the Chronicle of the Annual Register for that month says, 'A distemper which rages amongst the horses makes great havoc in and about town. Near 100 died in one week.' A good description of the Cleveland epizoöty is given by Bisset.[1]

Rutty, in Dublin, records that 'It was one of the wettest autumns in the memory of man, and yet remarkably healthy. Ophthalmia prevailed during the N.E. winds in April, and an epizoöty among horses at the same time, of the nature of an epidemic catarrhal fever, which took its rise in the winter, and was also common to other parts of Europe.' 'It raged in London and other parts of England in January, February, and March, and seized our horses in Dublin at the end of March, moving westward, as other epidemics frequently do, and on the 4th of April it was become general in this city, and continued till the end of that month, when most of our horses were recovering, although some remains of the disease appeared in June, and even July the 17th, in the coughs and broken wind attending some of them in consequence of the disorder. The distemper is said to have been more severe in the north than in the south. The mules also received the infection.' Rutty, tracing this epizoöty to an epidemic constitution of the atmosphere, and apprehending a connection between it and influenza and other human epidemics, writes, 'In 1727 there was an epidemic catarrh among our horses here, which also travelled hither from England, and, moreover, preceded a like disorder, viz. a cough and sore-throats among men, even as at Edinburgh before the catarrhal fever in 1732; their horses

[1] *Bisset.* Med. Constitution of Great Britain, p. 237.

had been previously affected. Again in the cold and dry spring, 1742, was an epidemic catarrh among the horses at Plymouth and here. In May, 1746 (the preceding part of the spring cold), was an epidemic cough among horses, and chincoughs and tumours of the parotids among men. In December, 1750, was an universal catarrhal fever among horses, rather more severe than this of the present year, 1760, which also travelled from England; and the like in December and January, 1751, and among mankind, coughs and inflammations of the face, eyes, and gums, at the same time. And (subsequently) many of the labouring horses who had this disorder suffered so much in their eyes as to have become blind.'[1]

A.D. 1761. In the month of April, volcanic eruptions and a great shock of earthquake in the Azores. Plenciz observes: 'The winter was mild and damp; with the departing wintry cold, frequent and abundant rains fell, such as to overwhelm not only Austria, Bohemia, Moravia, Styria, Carinthia, and Bavaria, but other countries, with inundations and overflowings of rivers, lakes, and streams. Great heat and drought followed this rainy weather, which lasted for the whole summer. At length a very moist autumn succeeded, accompanied by dense and perpetual clouds, till about the beginning of December, when a very hard and severe frost set in in the region of the Danube.'[2] In the Northern States of America, a severe epidemy of catarrh or influenza raged in the spring, and this malady, towards the summer and autumn, changed its character to, or was succeeded by, malignant yellow fever, which extended itself to the West Indies.[3]

In Boulonnais, France, rot in sheep manifested itself as a consequence, apparently, of the inundations in the winter and spring-time. The physician Desmars writes: 'Animals and vegetables were not exempt from the influences of the air; it was remarked that calves and lambs were fewer, feebler, and smaller than in ordinary years; oviparous creatures also experienced the vicious effects of the atmospherical constitution, for the broods of partridges were a failure, and game was not plentiful. The crops were very indifferent, the ears of corn being blighted,

[1] *Rutty.* Op. cit.

[2] *Plenciz.* Op. cit., vol. i. p. 206.

[3] *Bascome.* Op. cit., p. 130.

and there were hardly any raisin fruits. The disease in sheep began towards the end of October of the year 1761, and continued during the winter and until the middle of the spring-time. Its ravages were greater in the months of January and February than in those preceding this period, and they gradually diminished in March and April. In the low, damp, marshy cantons, such as those of Bainctun, Carly, Esques, and in general in all those which were inundated till the month of May, 1761, the greatest losses were suffered; while in those localities which are elevated, dry, and sandy, such as the Dunes of Camiers, Danes, and Ambleteuse, the flocks usually escaped the disease. The lambs were much more liable to it than the ewes. Of all those which were manifestly attacked, but few, if any, escaped. They died from dropsy and rot (*pourriture*). Water was often found between the skin and flesh of the head. The malady announced itself by bags full of water beneath the lower jaw. The belly was also filled with a similar effusion. The principal viscera of the abdomen were corrupted, and the liver offered the strongest indications of the affection, being filled with a great quantity of flat worms which the country people called *dogues*. It was noticed that the sheep continued to eat and drink heartily enough, and that they licked the walls of their sheds, and ate the earth. Their bulk did not diminish much, but their flesh was pale, and had lost its ordinary flavour; and in general all the mutton which had been eaten during autumn and winter was very insipid. The other beasts, such as horses, cows, and pigs, were not attacked by this disease, but abortions were very frequent amongst them, and obstinate inflammations (*feux opiniâtres*, erysipelatous affections?). With regard to the human species, the mortality was no greater than in the preceding years, although the autumn had been remarkable for the great number of tertiary fevers which occurred in the damp cantons.'[1]

In some districts of France, ovine small-pox broke out; and in Lower Normandy glossanthrax destroyed many thousands of cattle; while in Austria an epizoöty appeared amongst

[1] *Desmars.* Mem. sur la Mortalité des Moutons en Boulonnais. Epidémiques d'Hippocrate. Paris, 1767. P. 289.

horned beasts, and in some places even attacked horses and sheep. Plenciz thought it was Cattle Plague, but Heusinger attempts to show that this was a mistake; and that, according to Plenciz's own description, it was more than one disease, and consisted in an epizoöty of anthrax, and another of 'ekzema epizoötica,' or of glossanthrax.[1] The usual symptoms were loss of appetite, and sometimes an unappeasable thirst; the eyes were dull and heavy; the tongue and all the interior of the mouth apparently ulcerated; bad smelling discharges from the nostrils; no rumination, and absence of milk in cows. The majority were attacked by diarrhœa, and the dejecture were not unfrequently mixed with blood. Others had constipation, followed by a tympanitic state of the abdomen. The tongue became black and dry; the respiration difficult; gangrene attacked the back parts of the throat, and an apoplectic seizure usually preceded death. The autopsies were badly made; the author speaks of having constantly found vomicæ and abscesses in some of the viscera of the chest or abdomen, or in the brain—a result of metastasis. The disease, or rather diseases were supposed to be due to the ingestion of animalculæ, or their germs, which had been swallowed on the herbs the animals had eaten and in the water they drank. These germs became developed in their bodies and produced the disorder. To support this view, the hypotheses of Italian and Danish physicians are referred to, and numerous examples are given; by means of the microscope, Desmars thought he had discovered these germs and animalcules in an abscess newly opened. He strongly insists on the contagious character of the malady and the dangers of infection. '*Sana animalia caveant à pascuis, aquâ, fano, stramine, item ab omni supellectili, quo lue affecta animalia utebantur.*' Dogs and men were liable to carry the virus from the diseased creatures, and this was a most important matter. '*Quotidianâ constat experientiâ tam ab hominibus quam à canibus cum bobus lue affectis commorantibus, facilè ad boves et asinos idem contagium transportari et iisdem communicari posse, inde fit ut ab illis qui sanitati publicæ invigilare debent, hoc in casu certæ capiantur cautelæ.*'[2]

[1] *Heusinger.* Op. cit., p. 237.

[2] *Plenciz.* Medici Tractus de Contagio, seu de Lue Bovina ad finem Vergente, 1761, Epidemicè grassante. 1762.

This is probably the distemper mentioned as prevailing among horned cattle in Germany in the Medico-Philosophical Memoirs, wherein it is noted, that, in consequence of people having died from drinking the milk, the magistrates had interdicted the use of that article during the prevalence of the epizoöty. We are left in much doubt, however, as to the nature of the malady described by Plenciz, and altogether perhaps incline to the opinion that it was the Cattle Plague affecting oxen and sheep, occurring coincidently, as in 1745, with some epizoöty in horses.

Anthrax was prevalent in Kitzingen, Franconia, amongst cattle; and in Livonia and Esthonia the same disease attacked cattle and horses.[1]

In this year, there began a great epizoöty amongst dogs, which appears to have been what is since vulgarly termed 'distemper' (*maladie des chiens, morve des chiens,* in France, and in Germany *hundestaupe,* and *hundeseuche*). Before this period it appears to have been very rare, or almost unknown, and since its outbreak at that time it has lingered amongst the canine species to this day. It seems to have been first noted in Spain. 'In this year there was observed at Madrid a deadly epizoöty amongst dogs, which spread over the whole kingdom, but without affecting any other species of animals.'[2] In 1763, according to Webster,[3] nine hundred dogs had died at Madrid alone, and in this year it is supposed that the malady had reached England, where, many years after, it was studied by Mr Darwin and Mr E. Jenner. The latter, writing in 1809, says: 'It may be difficult, perhaps, to ascertain the period of its first appearance in Britain. In this and the neighbouring counties I have not been able to trace it back much beyond the middle of the last century. . . . I knew a gentleman, who, about forty-five years ago, destroyed the greater part of his hounds, from supposing them mad, when the distemper first broke out among them, so little was it then known of those the most conversant with dogs.'[4] As Heusinger remarks, it is very probable that, in its commence-

[1] *Fischer.* Op. cit., p. 462.
[2] *Villalba.* Epidemiologia Española, vol. ii. p. 219.
[3] *Webster.* Op. cit., vol. i. p. 412.
[4] Medico-Chirurgical Transactions, vol. i. p. 265.

ment, the malady may have been mistaken for rabies, as Mr Jenner notices; and if such be admitted, then it is most likely that this distemper was in London as early as 1760, which would show that it extended from west to east; for according to Layard, 'in the year 1759 and 1760, madness raged among dogs in London and its neighbourhood, in consequence of the mild winter and early spring.'[1]

It appears to have reached Ireland at a later period, as Dr Rutty in 1764 notices this plague among the dogs at Doneraile, County Cork. 'The symptoms are a great discharge of a gleety humour from the nose and eyes; a difficulty of breathing; a violent beating of the heart, also convulsions, and great weakness in the back and hind legs. It is infectious, and seems to resemble the late murrain among the black cattle in England.'[2] The disease appears also to have manifested itself near Dublin. 'Several dogs in and about the city and county of Dublin have been seized with the disorder, which proved fatal to many of them.'[3]

And in America, about the year 1760, a disease was observed in dogs. 'About twenty-five years past an epidemic distemper prevailed among dogs, and occasioned a great mortality.'[4] In 1763 it broke out at Boulonnais, in France, in consequence, it was said, of its having been carried from England; and towards the end of the year it had shown itself in the royal kennels at Versailles, and, indeed, over the whole of France, where it continued during the three following years. Desmars[5] witnessed its effects at Boulogne, and described its symptoms; but the veterinarians who investigated the nature of the epizoöty in the royal kennels at Yanville, in France, give us a much better account of it. 'At the end of the year 1763, and during 1764, there appeared in France and the neighbouring countries, an epidemic disease affecting every variety of the dog species. It had begun in England. Two maladies, or two forms of the one disease,

[1] *Layard.* An Essay on the Bite of a Mad Dog. London, 1763.

[2] Letter from Surgeon Wetherall to Dr Rutty in the 'Repository.'

[3] Letter from Dr James to Dr Rutty, also in the 'Repository.'

[4] Memoirs of the American Academy of Sciences, vol. i. p. 529.

[5] *Desmars.* Lettre sur la Mortalité de Chiens en 1763. Epidémiques d'Hippocrate, p. 316.

were distinguished. The first, attacking the throat, was accompanied with a very bad cough and fever; after coughing, the animals vomited a quantity of white mucus by the mouth, and purulent matter was discharged from the nostrils. The second was the worst and most dangerous: the dogs were seized with a violent fever; their heads seemed so heavy that they could scarcely carry them; they all at once lost their ability to move, and they were unable to raise themselves on their straw; they discharged much sanious matter from their nostrils, and had convulsions similar to those of epilepsy. They seized and bit their straw as if they had been mad, and the moment after they fell into a lethargy; convulsions followed, and at last they died between the alternating attacks of convulsions and prostration. Some were so quickly and violently seized, that they perished between the morning and the evening without its having been possible to administer to them either nourishment or medicine. Of the small number of those which were cured some became blind, the others were paralyzed in their hinder extremities; some reeled as if intoxicated, and, with the exception of a very small proportion, these have remained feeble in their limbs. . . . . How is it possible to find remedies for a malady which is unknown, and of which we have never heard speak? It is only when the dead animals are opened that it has been remarked that the blood is altered and the lungs full of pus. This contagion was very deadly. For six weeks it abated, then for a year it raged severely. It destroyed entire packs of hounds. In the kennels of the King more than 300 dogs, old and young, perished. Out of 120, which formed a small pack, one day only 32 could be mustered for the hunt; all the others were dead or sick. The huntsmen flattered themselves that in buying dogs from all quarters the malady would not reappear, yet it manifested itself at three different times. Only 15 dogs were lost at each of these attacks. A year after there was another visitation, which killed more than 60 hounds of the large pack; and out of 140 on the list, only two were unaffected. Very many of those which did not die were useless for hunting, and at the most only about 70 were saved. This last attack did not last long, but it was so severe, that in less than three days 30 dogs were lost. The

animals, on becoming sick, discharged blood by the nose and mouth, and so dreadful was the odour given off by them, that the stench from their kennels was insupportable; indeed, they were rotten before they were dead.

'At our suggestion, in 1768, the kennels were paved, thoroughly repaired, cleansed, and washed with quicklime, and thrown open for three months. After that time, other hounds were kept in them; and so well did they thrive, that in 1769 there were more than 100 in good health. It was then imagined that at last the means of preserving them in fine condition had been discovered; but at the end of the month of June following the disease reappeared, and destroyed the whole in less than six weeks. The kennels remained empty during the year 1770, and they were again whitewashed with lime; at the commencement of 1771 the bitch hounds were put in them to pup, and although since that time the puppies have been more fortunate than in the preceding years, yet more than a fourth of those born there die before they are four, five, or six months old.'[1]

In Gâtinais, during 1763-4-5 it was observed and described by Duhamel in a scientific periodical, published in France; we read for 1763: 'Some cats have been attacked by a malady which resembles a good deal this in dogs.' For 1764 it is remarked: 'The disease in dogs continues, and has killed many.' In 1765: 'The disease amongst dogs and cats has continued throughout the year, though not so extensively as in last year, but with the same accidents. Some cats have been attacked by itch, which has made them blind.'[2]

In 1764, during the month of December, this distemper appeared in Bohemia, according to Sagar.[3] In Franconia it was observed in the month of April in this year, and at the commencement of September in Italy. Heusinger gives a list of the great number of works which contained notices of this memorable epizoöty, some of which I give below.[4]

[1] Journal Pratique de Méd. Vét., vol. iv. p. 610.

[2] Memoirs de l'Acad. Royale des Sciences, 1764-5.

[3] *J. M. Sagar.* De Morbo Sing. Ovium Vindob. 1765.

[4] For Burgundy, in 1763: *Nicholas Fournier.* Observations sur la Nature, les Causes, et le Traitement de la Maladie des Chiens. Dijon, 1764, 1775. For Paris, in 1763-4: *Audouin de Chaignebrun.* Relation de différentes Maladies

In Scotland there was a remarkable destruction of cows. 'At Cumbernauld, in Scotland, they have lately had a violent storm, attended with thunder and lightning, which have done great damage to the planting, and killed above 1000 cows. Upon examination, it appeared that their bones were all broken, and their flesh quite black, and when offered to the hogs they refused to touch it.'[1]

A.D. 1762. In this year a comet was visible, and there was great heat and drought in the United States, which induced bilious remittent fever in the autumn. Similar weather was prevalent in England, Ireland, and France. In consequence of the great prevalence of caterpillars of a very destructive species of lepidopterous insect in Britain, this year is known as the 'wormy year.' The whole of the herbage on the hills near the sources of the Ettrick and Yarrow was destroyed by it.[2] 'Great hurricane and fall of snow in England. Much damage done; many men, sheep, and cattle perished.'[3] Catarrhal fever or influenza was *epidemic* throughout Europe.

Rutty, writing in Dublin, remarks: 'In May, 1762, the effects of the epidemic catarrh among the horses, which began in Dublin in March, 1760, are yet felt among the labouring horses; and it has been computed that one in ten of those were so affected in their eyes as to be blind to this present time.'[4]

In Beauvais, and some other provinces of France, sheep small-pox was wide-spread. Anthrax (*louvet, lovat*) was very prevalent in Switzerland. Glossanthrax appeared as a very deadly epizoöty amongst cattle in Lower Normandy, and amongst sheep in Lorraine.[5] In the month of March, the same

Epidémiques, &c. *Goulin.* Mémoires Litt. et Crit. 1775. *Brasador.* Mém. de Mathém. et de Phys. présentés à l'Acad. de Sciences, vol. vi. p. 216. *Verrier.* De la Conferie Vénerie Normande, 1778. For Franconia, in 1764: Fränkische Samml., vol. vii. p. 542. For Italy: *Merli.* Lettere Concern. l'Epidemia Sofferta in Napoli. Naples, 1764. *Sarcone.* Istoria Ragionata dei Mali Osservati in Napoli. Naples, 1764.

[1] The London Magazine, 1761, p. 441.

[2] The Farmers' Magazine, vol. i. p. 124.

[3] The Annual Register.

[4] *Rutty.* The Repository.

[5] *Paulet.* Op. cit., vol. i. p. 248. *Schnurrer.* Chronik der Seuchen. Part II. p. 325.

disease was very destructive in the Valley Camonica, in Italy, and in the month of April it manifested itself in Istria.[1] In Sweden and Denmark cattle and horses were attacked by an epizoöty, which was erroneously supposed to be the *Cattle Plague*, but which Heusinger thinks was probably an influenza, complicated with an aphthous affection. It was remarkable for the formation of depôts of unhealthy matter at the two last articulations of the tail. The Royal Agricultural Society of Paris was furnished with an account of it by one of its members at the time, and from this the following extracts are made: 'The contagion spread with great rapidity. The youngest, most robust, and best-conditioned animals were soonest seized, and died most promptly. It was remarked that, in the majority of cases, a cough was the first symptom of the disease. The eyes became dull, watery, and muco-purulent, and tears flowed from them. In one or two days after the first symptoms, the milk, in cows, began to fail; this was one of the surest indications that the animals were attacked by the disease. At the commencement, the beast looked cold, and it shivered in something the same way as a human being at the onset of a fever. A high temperature was soon perceptible, which continued for many days; it was most apparent about the neck, and by the increased beats of the pulse. The appetite became suppressed, but the animals drank willingly so long as the inflammation did not prevent their swallowing fluids. A spumy saliva, accompanied by an insupportable odour, flowed from the mouth and nostrils; in many the teeth became loose; constipation was not uncommon, but usually there was diarrhœa from the commencement, the excrement being like water. Towards the termination of the malady, the two last articulations of the tail became gangrenous and softened; and if the skin covering them was removed or punctured, a fetid purulent fluid escaped. The gangrene extended upwards, step by step, until it reached the horns, which then became cold; when it got as far as the ears and the nostrils, which usually occurred about the sixth or seventh day, the animal died. The blood abstracted during life was of a bright red colour, and soon exhibited a high inflammatory state;

[1] *Bottani.* Op. cit., vol. vii. p. 68.

but on becoming thoroughly cold, it was quite solid, of a pitchy black colour, and could be cut like a piece of jelly. The examination of those that died showed the gall-bladder excessively large and full of a liquid more like urine than bile; in some three pounds' weight of this fluid was found. In many creatures the stomach and intestines were full of worms, which were yet alive when these organs were inspected. In some of the blood-vessels certain insects were met with which were named 'plaice,' on account of their resemblance to that kind of fish. Sometimes the brain has appeared to be entirely resolved into pus and water; many had the veins filled with dark blood; the neck in others was inflamed; while in others, again, the inflammation appeared to have concentrated itself in the intestines, and these have been found more or less gangrenous. The stomach was full of undigested food, which was so dry and compact that it could scarcely be broken. The membrane lining the stomach and intestines was marked by livid or black spots, evidently indicating gangrene; with some the liver and the spleen were covered by small tumours resembling grains of sand, and so hard that they could not be crushed; the substance of these organs, however, was so soft that it could be easily broken up by slight pressure. Other animals, again, exhibited no pathological alterations when opened after death.'[1] This epizoöty was very deadly in Sweden, and extended even to the frontiers of Germany.

About the same time an epizoöty belonging to this class of maladies broke out among the cattle in Auvergne, Moulins, Limousin, the province of Bugey, Champagne, Forez, and other places in France. The appetite and rumination were in abeyance; the hair was dry, upright, and harsh; the head was carried low, tears streamed down the cheeks; the flanks heaved very frequently; the mouth, horns, and ears were extremely hot; considerable pain was manifested along the course of the spine, and when the fingers were passed over this region, a crepitation was heard like to that made by dry parchment. Indistinct tumours began to rise over the whole surface of the body; when these disap-

[1] *Paulet.* Op. cit., vol. i. p. 359.

peared suddenly, which they often did, it portended a fatal termination. There was great prostration of the strength; an excessively cold stage succeeded the early hot one; the belly became tense; the pain increased along the spine, or it disappeared, either owing to some internal cause or by the effects of remedies; continual moans preceded death. The dead bodies, when opened, exhibited evident marks of gangrene and putrefaction. The diagnosis of the malady consisted chiefly in the presence of the crepitation along the back, which, although only symptomatic and accidental, formed, nevertheless, a very striking feature, and was sufficient to distinguish this affection from others of the same class. The absence of mucus discharges from the nostrils and mouth, the high temperature of the ears, the horns, and the mouth, and the presence of tumours, constituted, in the opinion of the authorities of those days, a particular and pestilential disease of the gravest character.[1]

An epizoöty of gangrenous sore-throat (*angina gangrenosa*) occurred in the parish of Mezieux, in Dauphiné. It affected cattle, horses, and mules, and was very destructive. The illustrious veterinarian, Bourgelat, founder of the French Veterinary Schools, was deputed to investigate its nature and suggest remedies. The symptoms as detailed by him were: 'Refusal of all kinds of food, solid or liquid; the head hanging low and ears drooping; tearful eyes, and hair erect and harsh; decided constipation; a painful swelling in the region of the lower jaw and along the neck; a pulse more firm (*concentré*) than frequent; and a copious discharge of frothy mucus by the nostrils and mouth of some, were the signs which were exhibited during the first twenty-four hours, and which remained for the space of two, three, or four days, about which time hurried heavings of the flanks and extreme feebleness announced a prompt and inevitable death.' The lesions after decease were found to be very marked. Putrefaction set in rapidly, and 'there was manifested in the back part of the throat, in all the muscles of the pharynx and larynx, in the cellular tissue enveloping or separating these, and in the œsophagus and trachea, a great amount of gangrene; the membrane enveloping the base of the

[1] Mémoire de M. Barberet.

tongue and the soft palate was black, livid, and gangrenous, and covered with ulcers which had destroyed and gnawed away the base of the tongue. On a section being made across the muscles of this part, they were found to be pale, bloodless, and sphacelous; the pituitary membrane, thicker than in ordinary circumstances, was black, studded with ulcers, and the fluid with which it was gorged resembled very thick ink rather than blood. There was caries of the ethmoid bones and the cartilages of the nose, the enveloping membrane of which was also destroyed.' The external tumefaction was not always confined to the immediate region of the throat. 'Often it extended to all the intermaxillary glands, the neck, and the bronchiæ, forming considerable external tumours, ... there were some instances in which the throat was not in so diseased a state, but tumours appeared in an indistinct form in every part of the body. In some dead animals they were in the omentum, in others in some portion of the intestines; in others, again, the spleen was greatly engorged; in a fourth class neither liver nor lungs were in their natural condition, but their margins were swollen, black, turgid, inelastic, and verging on gangrene. In all, the digestive apparatus was in that depraved state which is usual in serious diseases.' Further on, in describing the alterations in the parts of the throat affected,—their red, brown, and sometimes black colour, and their softness, he says that 'they were the consequences of a violent inflammation, neither phlegmonous nor erysipelatous, which excites less fever and pain than these,—an inflammation of a heavy dull kind arising from an engorgement produced by the stupor of the parts.'[1]

The principal causes of the disease were supposed to be the excessive heat of the weather, bad herbage, and more particularly the extremely unhealthy stagnant water the animals were compelled to drink. The malady was conjectured, and perhaps justly, to be contagious; so that every care was taken to prevent communication between the healthy and the suffering animals, and disinfection was sedulously resorted to wherever the epizoöty appeared.

A.D. 1763. The seasons of this year were very dissimilar in

[1] Notes au Mémoire de Barberet.

their character in different countries, but nearly everywhere the summer was moist and sultry; the harvests were bad, the cereals being damaged. It is noted that the olives suffered from the unfavourable weather at Montpellier. 'It is even thought that the olives have been much injured by a fog which the country people call "néble," and that they have been all gnawed and perforated by a worm; this insect has grown insensibly, and it becomes very much developed in all those trees which have been preserved a very long time; the oil extracted from them is pungent and very bad.'[1] The human species suffered much from epidemies of a serious character. Schnurrer reports that glossanthrax appeared in the summer of this year in the western parts of Switzerland, and spread to the eastward, always following, however, the course of the Alps.

The maladies amongst animals were generally numerous and fatal. Rutty and other English writers thus summarize them :—

'Last year we had an account from Denmark, of an epidemic catarrh among horses, and that the dogs were infected by lying in the stables among them; and from Madrid, May the 5th, that 900 dogs died in one day; and from Genoa, of a mortality among the poultry; and May 19th from Calais a like account, and that the disease was fatal chiefly to hens.'[2]

'An epidemic among the horses in France characterized by a defluxion from the nose.'[3]

'Many epizoöties raged in Europe among horses, swine, horned cattle, sheep, dogs, game, and poultry.'[4]

In the marshy region of Brouageais, Rochelle, in France, malignant anthrax attacked cattle and sheep, and numbers of horses, pigs, dogs, and fowls perished at the same time. This malady also existed in other provinces of France, and from the descriptions given of the disease as it was observed in horses and cattle, it would appear to have been glossanthrax. 'There arose suddenly, towards the beginning of the month of June, a disease amongst horses and cows, which attacked nearly all the animals of the various villages in three or four days; it came from high Gâtinois and commenced in this locality soon after the fair of St Peter.

[1] *Fournier. Richard de Hautesierck.* Recueil d'Observations, vol. i. p. 39.
[2] *Rutty.* Op. cit. [3] *Freeman's* Journal. [4] *Webster.* Op. cit., p. 412.

It manifested itself by a small white blister above or below the tongue, and sometimes, though rarely, both above and below it; the progress of the disease was so rapid that in about twelve hours the little vesicle or tumour became as large as a man's hand and assumed a violet colour; notwithstanding this, the stricken animals did not lose their appetite, but the gangrenous eschar was not long in eating through the tongue, which fell off when remedial measures were not adopted. . . . . The malady has run through all the villages one after another, and nearly all the beasts in a village have been attacked at one time.'[1]

Dr Nicolau gives a most excellent, but lengthy, description of the outbreak in Brouageois. The parishes in which it exerted its greatest fury were situated in the neighbourhood of the marshes, which were often covered by the waters of the sea, introduced by a canal. In summer, when these marshes are crowded with flocks and herds, the putrid exhalations engendered by the heat of the sun give rise to intermittent and putrid fevers among the human inhabitants of the villages. The year 1763 had been very rainy, and there was abundant pasturage; but the hay was spoiled by the wet. Sheep, horses, and even pigs were equally attacked, and other domestic animals were not exempt:—the dogs, for example, which were nourished on the flesh of the dead cattle suffered, and in the hamlet of St Symphorien fowls died. In the month of May, the cattle had a disease of the tongue, which, however, did not make much progress. In June and July, the anthracoid disease broke out among the sheep, which died nearly as soon as they were attacked. The oxen and the mares suffered most in July, and the malady lasted until September. The earliest symptoms were a refusal of all food; dulness; drooping head, cold and hanging ears; horripilation; the flanks drawn up and beating quickly; the abdomen distended and tense; the muscles of the body twitching, and the animal standing as if making efforts to urinate; the urine as clear as water; no rumination; the evacuation of excrements less frequent than that of the urine. Some hours after these first symptoms set in, if tumours did not make their appearance on the surface of the body, shiverings and tremblings ensued, the

[1] *Duhamel.* Mem. de l'Acad. des Sciences, 1764.

eyes looked haggard and tearful; a tenacious mucus flowed from the mouth and nostrils; they lay down and died tranquilly, or in convulsions. These symptoms often ran their course so rapidly that the animals died without any one having seen them; they were even observed to drop down and perish in the yoke. The cattle and sheep had never looked healthier than in this year, and the best and fattest were the most likely to be first destroyed by the epizoöty.[1]

The epizoöty described as reigning in Denmark and Sweden in the preceding year, was still prevalent in those countries, and a similar affection had shown itself in Prussia.[2] Mention is made of an extraordinary epizoöty amongst fowls. Bascome and Rutty notice it as occurring at Genoa in this year, and Villalba speaks of its appearance in Spain: 'In this year there appeared another epizoöty amongst the fowls, and which only affected this species of animal; it killed very many, and no one was able to prevent its ravages.'[3] In the same year it had invaded the South of France, for M. la Berthonye mentions his having made a dissection of two fowls which had died at Toulon in May; the appearances presented by these he enumerates as follows: 'The examination of the first showed all the parts, internal and external, in a natural and healthy state, with the exception of the liver, which was adherent; but in exposing the whole length of the canal which conducts the food from the crop to the gizzard, in the second fowl, I perceived that the extremity of the latter organ was humid, livid, and corrupted to the extent of a finger's width; in detaching this substance from each side, it exuded a purulent and abundant matter, full of white globules, which left no doubt as to the presence of a fully-formed abscess. On again inspecting the first fowl, which had not been opened in the same manner as the second, the same phenomena were presented, and pus globules were observed. I then had no doubt whatever that the disease which harassed this species of animal was nothing but an inflammation, terminating in suppuration; and I imagined I could trace the remote cause to the barley and bran on which the fowls had been fed during this

[1] *Barbaret.* Mémoire sur les Maladies Epidémiques des Bestiaux. Paris, 1765.
[2] *Gleditsch.* Abhandlung, vol. i. [3] *Villalba.* Op. cit., vol. ii. p. 219.

year; for the great inundations which so troubled the whole kingdom, both before and after the harvest, had made this aliment not only bad but scarce.'[1]

In Bohemia in 1763-4, Tam notices its prevalence,[2] and Sagar writes of the disease in Moravia in 1764.[3] In a journal of those days published in Germany, we learn that the malady was not very prevalent in the north of that country, nor yet in other northern regions. 'In Spain, France, and Italy, for some time past, a disease among the feathered tribes, but especially hens, has caused great destruction and loss. In Cremona alone 5000 have died within two months; many were opened in order to discover the cause, but nothing was found in the interior of their bodies, except a large quantity of acrid fluid, which arose, it was supposed, from bad nourishment. Among the dogs, also, was a distemper, which sooner or later ended in madness. Hence in Asti, Alexandria, and other places, all dogs, no matter who their owners were, were slaughtered by the authorities. Nine hundred of these animals were killed in Madrid in one day.'[4]

An epizoöty of aphthous fever (*ekzema epizoötica*) in Moravia, is recorded, which attacked cattle and sheep. Doubts have, however, been expressed as to the disease being the one named. The most exact accounts we have are those of Michael Sagar,[5] and the malady may have become altered in its type from what we are accustomed to see now-a-days, though doubtless it is the same disease. The vesicles do not seem to have been analogous to those observed in modern times, and this author says that the *ulcers* which succeeded the eruption were pale and of a dirty-grey hue, of a very repulsive aspect, and sprinkled over with red points; that their margins were hard, that they extended rapidly and deeply; and also that they secreted a sanious humour which was fetid, acrid, and corrosive, and possessed contagious properties to a very high degree. He adds, that from the time desquamation took place the animals began to be lame, and that this lameness was caused by tumours of a greater or less size developed all at once, and full of ripe pus, which showed

[1] *Richard de Hautesierck.* Recueil d'Observations, vol. i. p. 169.
[2] *Tam.* Horn-, Schaf-, Pferde-, und Federvieh-Arzneikunst, p. 543.
[3] *Sagar.* Op. cit. [4] Hannöverisches Magazin. 1764.
[5] *M. Sagar.* Medic. Libellus de Aphthis Pecorinis. Viennæ. 1765.

themselves in some parts of the feet; that the aphthæ were found in the nostrils in such quantity that the passage of the air was intercepted, and that this was the cause of death to many animals. The milk communicated the disease to dogs, cats, and to people who used it as food. When put near the fire, it separated quickly into butter and cheese; it had neither its usual sweetness, nor yet its natural consistency. The oxen were the first attacked, but when these and the bulls were vigorous scarcely any died; some of them lost their hoofs. Sheep were worse affected, for nearly all that were attacked cast their hoofs, and they had to limp about until new ones grew; but few, however, died. Goats suffered in the same way. Pigs, of all animals, were the most severely attacked, and many perished. All those which escaped death shed their hoofs. The men who were infected by the disease experienced a great difficulty, amounting to impossibility sometimes, in swallowing, owing to inflammation and tumefaction in the back part of the throat. Sagar attributed the cause of this epizoöty to an eclipse of the sun, and to the red blight or 'rust' which affected the plants, as well as to the intemperature of the air.

At the same time, this aphthous fever was prevalent in the neighbourhood of Paris, and in Perigord and Auvergne, attacking horses as well as cattle.[1] M. Huzard remarks: 'It appears that during the year 1763, and at the commencement of 1764, aphthous diseases form the essential characteristics of the epizoöties which have reigned amongst horses and cattle over nearly the whole of France.'[2]

In the public papers of the time, it is also mentioned that in Holstein, and at Nordhausen and its environs, a contagious disease which attacked the horned cattle, and horses, sheep, and pigs, had been observed. A putrid and purulent matter was seen to issue from their feet; the skin on the surface of the hogs' bodies and their flanks was observed to peel off. None of the affected animals died.[3]

In Switzerland, and also in Suabia, erysipelas (*rothlaufes*) was epizoötic amongst swine, and killed a considerable number.[4]

[1] *Hurtrel d'Arboval.* Dict. Vet., i. p. 116.
[2] *Huzard.* Instructions and Observations.
[3] *Paulet.* Op. cit., vol. i. p. 397.
[4] *Wirth.* Op. cit., p. 110.

In the autumn of 1763, the Indians on Nantucket and elsewhere in that region were attacked by a bilious fever, which killed a large portion of their number. No white people were attacked, though they mixed freely with the Indians; though persons of mixed blood were affected, but recovered. Immediately after this pestilence had disappeared, a species of large fish, called 'blue fish,' thirty of which would fill a barrel, and which previously had been caught in great numbers on every side of Nantucket, suddenly disappeared, to the immense loss of the inhabitants. Whether they perished or migrated is not known.[1]

A.D. 1764. The year was mild, but rainy; in December, Lisbon was shaken by an earthquake and a comet was seen. Pestilence in mankind was very fatal in Spain, in the form of miliary fever. 'Salvarisa supposes the epidemic fever of 1764 at Cadiz was occasioned by the old and corrupted corn; amongst the poor the disorder was most violent. In this year the animals were first affected, and the mortality was principally observed amongst birds fed on grain.'[2]

Suabia was severely visited by a similar malady; Austria was no less troubled; and Scotland and Ireland had much disease raging amongst their populations.

Rutty says of the weather in Ireland: 'Spring—moist, dry, and cool; summer—cool and moist; autumn—variable; winter—warm and moist. The excessive moisture of the winter this year, succeeded by a dry and healthful spring, may show how the mischiefs of one extreme may be corrected by its contrary succeeding, and indicate the expediency of a retrospection upon these occasions.'[3] He adds: 'To the instances of mortalities among other animals mentioned last year, it may be proper to add that this spring we had an account of a mortality among swine and horses in Italy; and in June from Provence, in France, of a mortality among their horses and mules; and in August, from Sweden, that there was a mortality among horned cattle, the horses, sheep, goats, and swine. These accounts seemed to be somewhat alarming, and are here recorded and recommended

[1] *Webster.* Op. cit., vol. i. p. 412.
[2] *Hancock.* In Cyclopædia of Practical Medicine.
[3] *Rutty.* The Weather and Seasons.

to further observation, how far such mortal epidemical diseases among the brutes may or may not be a prelude to the pestilence among men, which by the divine poet is described as walking in darkness, Psalm xci. 6.'

'A mortal pestilence among horses and mules in Provence; and among poultry in England.'[1]

The aphthous disease mentioned in last year as showing itself in the lower animals in certain regions continued this year, and extended itself to other countries. In some of these it appears to have differed somewhat in its features, though it was general in nearly all the domestic animals. It was observed in Holland, and in Holstein, at Nordhausen, to affect horses, cattle, sheep, and pigs, &c.;[2] and it was prevalent in Henneberg and Thuringia,[3] in Saxony,[4] in Westphalia, in the Rhine provinces, and in Wurtemberg,[5] where it was known as the *zungenkrebs* or *mundfäule*. In Franconia and Suabia its appearance had been remarked from the month of July. 'The horned cattle were attacked by a great fever in the head; they began to sputter and to run from the eyes; the nose and mouth began to swell, and —especially on the palate—white, and in the nose yellow, pustules showed themselves; these after a time scabbed over and fell off, and the tongue became quite sore. Similar eruptions showed themselves between the hoofs, and in cows even upon the udders; so that in milking the scabs were rubbed off, until at length they ceased to give milk if the sickness lasted long. Some cattle continued to eat well, but others lost their appetite. The same kind of pustules manifested themselves on sheep, pigs, &c.'[6] 'All the cattle, those at pasture as well as those kept in stalls, and those also in process of fattening, have the following symptoms: between the claws, both before and behind, the skin is quite white, and cracks appear, which suppurate; some, however, have not this symptom. Those people who wash these abrasions too much keep the cattle longer lame and sick; but those who let nature have its course may use them again in nine

[1] The Repository.
[2] *Paulet.* Op. cit., vol. i. p. 397.
[3] *Glaser.* Abhandlung. v. d. Knotenkrankheit, &c., p. 133.
[4] *Clarus und Radius.* Beiträge. Vol. viii. p. 325.
[5] *Casseler.* Poliz. und Commerz. Zeitschrift, 1764.
[6] Fränkische Sammlung, vii. p. 544.

or ten days. These cattle, generally speaking—some sooner, some later—after they have been lame, get bad mouths. Saliva flows in large quantities, and when the disease assumes a serious aspect, it chokes them, or makes them appear as if they had something in their throats. When one draws the cow's tongue through the hand, the skin peels off, and whenever the mouth is affected the animal gives bad milk; the first attempts at milking show the milk to be of a reddish or purulent hue, but after this it comes away in its usual colour; this milk has been given to swine, and they have died from it. To-day I have been informed that such milk was given to a dog yesterday, and now it is dead. The cows suffered most, although the larger number attacked were oxen. The sheep also were affected, and though none of them succumbed, yet they were very sick.'[1] In Switzerland, pneumonia was prevalent in some districts.[2]

A.D. 1765. The winter of this year was cold, and the summer damp. In the Tyrol, gangrenous inflammation of the lungs affected cattle.[3] In Moravia, great numbers of sheep died from an epizoöty which, from the symptoms described by Sagar,[4] may have either been rot or a malignant catarrh (Heusinger). The Cattle Plague was imported from Turkey to Bruck, on the river Leitha, Hungary, in the month of February, and it remained there until the autumn; from thence, according to Koczian, it was carried to Upper and Lower Saxony.[5] Might not the ovine disease described by Sagar be the Rinderpest, transmitted from the cattle?

In India an earthquake was felt along the banks of the Ganges, and much sickness prevailed in that country. Animals shared in these troubles, especially in Madras. 'James Anderson says that, in 1765, he observed twelve days in one season and fourteen days in the other, when the heat and vitiated state of the atmosphere was such that sometimes the men, without any previous illness, fell down dead at roll calling. Various birds of the forest took shelter in tents, and drank water when offered to them, as if they had been domesticated. A hare came into the

[1] Fränkische Sammlung, p. 549. [2] *Trumpy.* Glarner Chronick., p. 647.
[3] *Bottani.* Op. cit., vol. vii. p. 72. [4] *Sagar.* De Morb. Singul. Ovium.
[5] *Kockzian.* Prüf. d. urs. die Hornviehseuche. Vienna, 1769. *Paulet.* Op. cit., vol. i. p. 295.

tent of Adjutant Gee, and drank water out of his hand; several antelopes were easily taken by dogs.'[1]

Wirth remarks that erysipelas (*rothlaufes*) was present in an epizoötic form in Switzerland and Suabia, and was very fatal.[2]

A.D. 1766. Eruptions of Vesuvius and Hecla, and two comets visible this year. Earthquakes were prevalent. The winter was very cold, the spring rainy with inundations, and the summer hot and dry all over Europe and America; so that vegetation was hindered, and in many countries it was blighted with honey-dew and rust, more especially the barley and oat crops. Malignant catarrh in man swept over Europe. Horses and horned cattle died in great numbers in America, especially in New England and New Jersey.[3] The Cattle Plague was raging in Austria, in Prussia, the March of Brandenburg, and in Holland, where it continued in 1767-8, and in 1769 it was carried into Belgium.[4] It only ceased in 1770, after destroying in Holland alone more than 395,000 head of horned cattle.

In England, rot in sheep appears to have been prevalent. 'Too rainy a season is very prejudicial to sheep, as was remarkably experienced *all over England* in the summer of 1766, when whole flocks perished with the rot.'[5]

The eruption of Mount Hecla, in Iceland, caused much loss among cattle.[6] Some lingered for a year, and when opened their stomachs were found full of ashes.

A.D. 1767. A cold winter and a wet summer in England. An eruption of Vesuvius. In December, a catarrhal fever or 'influenza' broke out in mankind at Madrid, and spread over the greater part of Europe. Scarlatina was very prevalent in France, and puerperal fever in Normandy. In due course the influenza reached England, but before it attacked the human species, dogs and horses were affected, and the vegetable kingdom appears to have been diseased as well. 'The 30th June: a blight of fruit, feverish complaints, and pains in face and teeth very epidemic. All Saints' day: two disorders have been very universal among

[1] *Annesley.* The Diseases of India.
[2] *Wirth.* Op. cit., p. 110.
[3] *Bascome.* Op. cit., p. 133.
[4] *Lorinser.* Die Rinderpest, p. 25.
[5] *Mills.* Treatise on Cattle, 1766.
[6] *Sir Joseph Banks.* MS. Journal. *Hooker.* Tour in Iceland, vol. ii. p. 117.

horses; one a violent swelling of the legs and eyes, the other a cough with which horses were taken this day, and, what is very remarkable, scarce either a day before or after. . . . . In the year 1767, a dry cough became prevalent in Essex among horses, about Allhallowtide, which continued through great part of November, and then subsided. In the neighbourhood of Walthamstow very few horses escaped it.'[1]

Mumsen says: 'When I was in England, in 1767, there raged a severe winter with a cold, dry, north-east wind until late in May. Then there came a disease in dogs and horses, such as is observed often to precede deadly human plagues; it was called the "horse cold" (*pferde-schnupfen*). It did also visit mankind without inducing any very serious consequences.'[2] The London Evening Post notices this outbreak: 'There is scarcely a stable in London in which there is not a horse suffering from inflammatory catarrh. This disease could not be so general if there was not some special vapour in the air to produce it.'[3]

The Annual Register (p. 151) for this year also remarks: 'This autumn has been fatal to the horses in America, as well as England and Holland. The distemper there has been attended with fatal effects; in the province of New Jersey, it has carried off almost all their young horses and colts; and in New England the havoc it has made is very ruinous.' 'Diseases among horses were also very prevalent in New England and New Jersey.'[4]

The distemper in dogs was so violent in Louisiana, that the greater part of them died.[5]

In Hanover, there was a great mortality amongst the geese.[6]

In France, the lower animals seem to have suffered equally with mankind. Menuret, of Montpellier, writing of this year says: 'The mortality which has manifested itself amongst different kinds of animals seems to merit a place in our observations, and ought to arrest our attention in many respects; but chiefly because of its relation to the constitution of the seasons, and also because it is a phenomenon which may some day assist,

[1] *T. Forster.* Op. cit., pp. 6, 168.
[2] *Mumsen.* Kurze Nachricht von der Epid. Schnupfenkrankeit.
[3] The Evening Post, Nov. 10, 1767.
[4] *Webster.* Op. cit., vol. i. p. 417.
[5] *Ulloa.* Noticias Americanas.
[6] Hannöv. Magazin, 1767.

by way of analogy, in clearing up the causes of disease in man. It is necessary to remark that the violence of the cold has been excessive during the winter, so that animated beings have been scarcely able to resist the energy of its attacks; we can now perceive that this extreme cold has penetrated deep into the bowels of the earth, and has destroyed—even to the ultimate rootlets—the warmth and the life of the vegetable kingdom, and which nature has ordained should be concentrated there. Those trees and shrubs which seemed by age to have acquired most consistence and durability have been precisely those which have most readily succumbed; the oldest vines have been devastated. And so it has been with the human species. The aged, worn down by years, have been deprived of the remains of their animal heat which kept them alive; the cold, an enemy to motion, has succeeded in arresting the blood which flowed but tardily in the shrivelled vessels, and soon they ceased to live. It was observed in the course of the preceding year, towards the month of May especially, that a warm dew (*rosée chaude*), which is termed manna, fell in great abundance, and that the trees, the vines, and the different vegetables had suffered a marked change. The silk-worms were the first to experience the bad effects from the leaves of the mulberry trees being thus altered, and they became very ill; from that time the turkeys, which form such a large portion of the agricultural wealth in this country, and the other fowls, have been variously affected until the end of the winter. Before the severe colds, the horses paid their contribution to the epidemy which ravaged the animal kingdom; they died in large numbers from vertigo, a kind of contagious frenzy which destroyed them in a few days; neither profuse nor moderate bleedings, enemas, nor any of the other means at the disposal of our hippiatrists, could arrest the course or ameliorate the furious rapidity of this affection, which quickly terminated in death. So virulent was the contagion, that, from the moment a horse was attacked in a stable, not only were the others which stood in the same building quick in receiving it from the diseased one, if they were not speedily removed, but the infection lingered in it for many weeks afterwards, and was not slow in attacking horses which might be stabled therein during this time; so that it

was necessary to leave these stables empty for a long period, in order to have them well aired and disinfected, and even white-washed repeatedly, when this malady had left traces of its fury and subtilty in the walls. At the same time, many dogs were seen to participate in the influences of the general disaster. They became dull and heavy, and their ears and tails were drooping; their eyes were hidden by muco-purulent patches, and they lost their vivacity and playfulness; they became sick, vomited, and cough and hurried respiration were the usual symptoms of their malady; these becoming augmented in intensity, quickly led to the common end of all terrestrial beings. The sheep in the whole of Lower Dauphiné, and in a part of Vivarais, were apparently the choice victims, and at the same time the most numerous, of the epidemic pestilence. The bad quality of the forage, and the violence of the cold, which would not admit of their leaving their sheds and seeking fresh pasture and a pure air, no doubt favoured the invasion and the subsequent progress of the disease. They were emaciated, withered, and weak, so that they could scarcely stand on their feet; then they have become swollen, and towards the end struggled convulsively against the violent destruction of their being. On opening the dead bodies, the abdomen has been found full of water, the liver enlarged and of a greyish-white colour, and thickly covered with ulcers and indurations; some people say they have even seen worms. The lungs presented abscesses more or less mature, and ulcers and tubercles; this alteration of course favoured very much the propagation of the disease, because it infected the air and charged it with a contagious ferment; for, being expired from an organ destroyed by rot, the morbid matters became for the other animals inhaling them the germ of a disease which was all the more potent because it was received into the bodies of those unfortunately already predisposed. The blood-vessels were flaccid, and half filled with a watery blood which had almost lost its colour.'[1]

In the month of March, 'aphthous fever' broke out at Guastala and other places in Italy. 'There was rendered more manifest every day in Guastala and other prefectures of Mantua,

[1] *Richard de Hautesierck.* Op. cit., vol. ii. p. 233.

a disease amongst cattle, which consisted in vesicles about the tongue, and which left raw places; it was so mild, that it easily gave way to simple remedies.'[1]

A.D. 1768. In this year the seasons were very irregular, and damaged the crops very much. Swarms of caterpillars made their appearance in America, in Northampton, and Massachusetts, and destroyed all herbage. The summer was hot and rainy, and disease prevailed in that part of the world amongst the human species. Hydrophobia was alarmingly frequent; in Boston and other places, at the same time, 'horses were generally affected with a disorder of the head and throat, which proved fatal to many, and much injured the serviceableness of those that survived.'[2] In this and the two following years, the Cattle Plague prevailed in Lower Austria, coincidently with anthrax;[3] it was very severe in Brandenburg and other provinces of Prussia.

A.D. 1769. The year was rainy, and a comet was seen. The harvest was indifferent, the corn and wheat being much deteriorated. Those diseases which, in mankind, could be attributed to the use of unwholesome bread, were frequent. In the month of January, a prodigious and unheard-of quantity of fish was taken in the Baltic.[4] There was an epizoöty amongst fowls at Genoa.[5] Over a wide extent of the North of France, an epizoöty was doing much injury to cows and horses. It was named in Franche-Comté *Murie.* In Hainault and Champagne it was particularly noticed. At Avesnes, it first broke out amongst the horses of two regiments of dragoons stationed there—those of Autichamp and Rochefoucault; and from thence it extended amongst the cattle in the Election of Joinville. Cough, high fever, and prostration were the first symptoms; after these appeared nausea, suspension of rumination (if in cattle), the breath fetid, the mouth hot and dry, discharge by the nostrils of thick, foul-smelling matters; but a continuous cough, feebleness, great difficulty in breathing, redness of the eyes, dryness of the

[1] *Bottani.* Op. cit., vol. vii. p. 75.
[2] *Tufts.* Memoirs of the American Academy, vol. i.
[3] *Adami.* Geschichte der Viehseuchen, p. 74.
[4] *Creplin.* Eckström fische von Mörkö, p. 35.
[5] *Franck.* Syst. de Med. Poliz., vol. vii. p. 150.

tongue and mouth, loud râles in the air-passages, the breath becoming more fetid—all indicated the approach of death; their absence gave tokens of a favourable recovery. An autopsy revealed congestion, lividity, and ecchymosis of the lungs, with abscesses and gangrenous spots on their surface, and flakes of gelatinous matter of various colours. In the texture of the lungs were found purulent infiltrations, which broke up the structure of the lobes. These organs adhered to the pleuræ, which often looked thickened, inflamed, suppurating, or gangrenous. Considerable effusions of reddish, putrid, foamy fluid were found in the thorax, and sometimes pus, &c. It was thought that the origin of the epizoöty was due to variations in the atmosphere, cold and heavy rains, the sudden transition from hot stables to the cold air, or exposure to these rains. It was termed an acute inflammatory fever, or false malignant peripneumonia. 'This disease,' it is added, 'though annual and familiar in our climate—often even epizoötic—is scarcely believed to be contagious; prudence, nevertheless, should make us act as if it were. The ventilation of the stables should be well attended to; sudden removal from heat to cold should be avoided, and the sick animals ought to be kept in an equable temperature, and have only tepid gruel to drink.'[1] The symptoms were supposed to indicate a gangrenous inflammation of the lungs. The Veterinary School at Alfort was consulted, and some of its pupils were despatched to the districts where the disease was most deadly. The measures they proposed had the happiest results, for whereas, before the arrival of these men, the animals were dying in crowds, they were now able to save 140 out of 160.

From the autumn of this year till the end of the year 1781, the Cattle Plague ravaged Holland and Ostfriesland most cruelly.[2] We read the following facts relative to 1769, in the *Gazette de France* for August 24th, 1770. 'During the

[1] *M. Bourgelat.* Notes au Mémoire de M. Barberet. *Paulet.* Op. cit., vol. i. p. 407. Lafosse (Traité de Pathologie Vétérinaire, vol. iii. p. 616) positively asserts that this 'murie' was the bovine contagious pleuro-pneumonia; but surely he must be mistaken. *Horses*, as well as cattle, were attacked, and the proportion of recoveries by medical treatment in this epizoöty is never reached in the deadly lung disease of our days.

[2] *Weiss.* Von der Viehseuche, p. 119.

course of the last year, 9800 cattle died in the province of Friesland. In South Holland, since the 1st of April, 1769, until the last month of the year, 115,665 head of cattle are dead, and 40,454 have been cured. During the month of April, 669 have died, and 221 have been cured. In June following 309 deaths, and 67 cures have been reported. In West Holland, since the 1st of April, 1769, until the last month of the year, 43,563 died, and 21,237 were cured. The number of those which perished in April is 555, and those cured 231; in May 443 died and 90 are cured; in June 160 deaths took place, and 423 were cured. The total shows that 162,276 cattle died, and 62,555 were cured.'[1] Dossie's statements, already furnished (page 354), refer to this period.

Vicq d'Azyr, alluding to the prevention of this terrible disease, makes a reference to the state of Holland—a reference quite as applicable to that country in 1865 and 1866. He says: 'In these epizoöties, we may resort to the most vigorous means, without doing any injury to the duties and the qualities of a good administration. We fail when we do not employ them. 1. When we have discovered a specific treatment, it is impossible to cause it to be universally adopted over the country. 2. In a great number of districts it is exceedingly difficult to induce the farmers to separate the healthy from the diseased. 3. If the communication between the cattle cannot be prevented, we cannot expect to keep away men, dogs, and other animals; their coverings necessarily escape the vigilance of the administration. 4. The sale of cattle, which is always effected in a clandestine manner, is also another means of communication. 5. The slaughter (*assommement*) of *diseased* cattle does not always succeed, because it is necessary to wait before all the animals on a farm are attacked before we can kill them; this requires a very long time—a circumstance which propagates the contagion and very much increases the expenses. 6. It is well known that as soon as the contagion reaches a farm, all the cattle are successively attacked, and that scarcely one escapes. It is evident that once the law of killing all the animals is brought into operation, it does not much

[1] *Cured* here means *recovered.*

matter to the proprietor whether he wait until all are attacked with the disease or are killed at once. This urgent measure is of advantage to him, because he is then paid the full value; whereas he only gets a third when the malady has developed itself. This severe law, however, requires great care in its execution, if a government has not the courage to carry it out everywhere at the same time. If not, then it becomes a vexatious and onerous measure. 7. It is also established that the best method of treatment, if we view it from every point, never cures more than one-third of the cattle attacked. And while we are trying to cure the cattle in one stable, the malady, perhaps benignant in a village where it has first appeared, is communicated to another in a very deadly form. 8. Everywhere, when the system of killing has been followed on the largest scale—in England (in 1815), in Austria, and in the eastern provinces, for example—the malady has been altogether destroyed; it exists, on the contrary, wherever people obstinately persist in medically treating the cattle, because then the infected centres become so extensive and so numerous that it is impossible to purify them all. *Holland furnishes an example.* After the *exposé* of the terrible destruction in that country, the truth of which there can be no doubt, it is evident that the most certain course to adopt is that of the slaughter of not only the diseased cattle, but also the healthy ones which have had communication with them; and to disinfect not only the stables where the sick have been, but also those where the suspected ones have dwelt. This strong measure stifles the pestilential germ in its birth, and does not allow it to be developed anew.'[1]

In this year, according to Wirth, the contagious pleuropneumonia of cattle appeared in France, causing much loss.[2] He alludes, I imagine, to the 'murie' in Franche-Comté, just described.

The same writer informs us that the 'rot' (*der Fäule*) appeared in calves and other herbivorous creatures in the Canton Zurich, and great destruction resulted.[3]

A.D. 1770. In this year the sugar ants made their first appear-

[1] *Vicq d'Azyr.* Exposé des Moyens Curatifs et Preservatifs, &c. Paris, 1776.
[2] *Wirth.* Op. cit., p. 300. [3] Ibid. P. 123.

ance in Grenada, West Indies, having been carried thence by smuggling vessels from Martinico.[1] An eruption of Vesuvius. The harvest was very bad, the crops being damaged by the heavy rains which fell during the year. Famine was severe in Germany, Poland, and Russia, and disease of a very fatal character appeared in mankind in Bohemia and Constantinople. Ergotism was very prevalent; it had commenced in the past year, was more severe in this, and yet more so in 1771-2. At the same time, in many countries, the lower animals were suffering from disease. Weikard notices this circumstance, as it presented itself to him in Germany. 'About the end of the year 1770, horses, and especially those kept in stables, were dreadfully afflicted with a certain putrid disease. This fatal sickness amongst them continued throughout nearly the whole year, and killed fifty of our very best. The putrid epidemy (*epidemia putrida*) was then unknown to us, but we gradually became acquainted with its character. At first we learned its nature by the morbid appearances exhibited after death; for the most part the lungs were found gangrenous and corrupt, evidently distinguishing it as a peripneumonic disease. It was erroneously believed that it could be cured only by bleeding and refrigerant remedies. It was also observed that a quantity of fluid and mucus filled the mouth of the sick, that the abdomen was swollen and tense, and the fæces very foul and more fluid than usual. *Post-mortem* examinations of the intestines discovered them to be inflated, and a yellow bilious matter abounding in them, and from this we thought it bore at the same time some resemblance to bilious fever. The happy realization of a method of certain cure favoured this opinion, for it was found that by the use of purgatives and antiputrescent remedies many could be saved. About the year 1771, also, the same thing happened to wild creatures, for they were attacked, as I believe, with an identical disease. In comparison of all the others their destruction was noted as being more severe in the most spacious menageries of our Prince.

'Some years, too, were fatal to the sheep; nor did birds escape, for geese, as I remember, were killed by this malady,

[1] *B. Edwards.* History of the West Indies, vol. i. p. 397.

which first attacked many pheasants reared in a beautiful garden near Fulda, some of which I found when they were nearly dead. When the diseased were examined, their gall-bladders were found greatly distended with yellow bile, which passed through its pores, and tinged the neighbouring tissues; if the game-keepers speak true, the whole of the body was saturated with bile after death. Behold an argument for the disease being a putrid bilious affection! behold the harbinger of the putrid epidemy of the human species now made known to us!'[1]

Wirth evidently traces some connection between this outbreak and the 'murie' observed in France in the previous year, for he says: 'The horse-plague, which prevailed in 1770 at Champagne in France, and at Fulda in Germany, was an inflammation of the lungs, or a typhus disease with lung complications, which destroyed a great multitude of horses.[2]

A contagious epizoöty appeared in France amongst cattle, which has been described by Bourgelat. It was apparently gangrene of the throat, but differed from the epizoöty of 1762. The disease appears to have concentrated itself chiefly in the nasal cavities, and the upper parts of the respiratory and digestive passages. Externally, nothing unusual was observable. Bourgelat thus writes of the symptoms: 'The first day a very great heat is felt in the horns, the ears, the extremities, and nearly the whole of the body; the pulse is quick and very strong, the eyes suffused and discharging tears, and the conjunctivæ inflamed. The animal eats, but less than usual; the blood drawn in this state is covered in a short time after exposure to the air by a pellicle of a rose colour, and about a line in thickness. This becomes re-covered and hidden by thick blood of a deep red hue.

'On the second day there is a dry cough; the pharynx and the nasal cavities are slightly inflamed; the flanks are agitated; the pulse announces a violent fever, and beats from sixty to sixty-five and seventy times a minute; the heat becomes dry and sharp; the milk is cloudy and thicker than usual; nausea and loss of appetite are noticeable.

[1] *Weikard.* Observations Medic., p. 5.

[2] *Wirth.* Op. cit., p. 156.

'On the third day the disease is at its height, and perfectly developed by reason of the augmentation of all the foregoing symptoms: the cough is more frequent and harassing; the respiration is very laborious; the beating of the flanks greatly quickened; a frothy saliva dribbles in an abundant stream from the mouth; the pituitary membrane is excoriated and puffed up in such a way as to prevent the passage of air into the nasal cavities; the parts at the back of the mouth are highly inflamed; a spumous yellow matter flows from the nostrils; the rumination is performed at a longer or shorter interval than in health; the excretion of fæcal matters and of urine is considerably retarded; the milk is thicker and yellower; the appetite always more depraved; the blood black and thick.

'On the fourth day, the disease being in its last stage, all the parts which were before so hot are now cold; this change comes on in such a way that the extremities of the horns and the ears exhibit it first, the cold insensibly creeping towards the roots of these parts; the animal shivers, and there can be observed, particularly along the sides and the flanks, horripilation everywhere over the *panniculus carnosus;* the pulse is scarcely perceptible; continual moans are emitted; respiration is greatly impeded; the pituitary membrane is gangrenous; the discharge from the nostrils is thin, fetid, and tinged with blood; the eyes are bleared and nearly always closed; all the excretions are interrupted, and the fæces from the rectum have an insupportable odour; the milk is very thick, rusty, and *ichorous;* the cough is heard no more; no appetite, no rumination; lastly, mortification and a colliquative diarrhœa, which succeeds rapidly to the shivering, announces the end of the animal, who dies without any violent effort on the fourth, or at the latest the fifth, day of the disease.'[1] The causes could not be positively ascertained.

In Italy an epizoöty amongst cattle. 'In 1770 a contagious malady appeared in the bovine species, but did not extend beyond the towns of Gognano and Costa, in the district and province of Rovigo. The disease consisted in a diarrhœa, the discharges being composed of a greenish matter often mixed with

[1] *Bourgelat.* Mémoire de 1770.

blood and very fetid, and causing the death of the animal in from four to five days.'[1]

The Cattle Plague was yet raging with renewed violence in Holland,[2] in Belgium, and the North of France. Some of the best authorities believed it had reappeared in Holland, and that its origin could be traced to the commerce in fresh hides which existed between that country and Hungary and Dalmatia. In Holland alone, it was computed that 600,000 head of cattle had perished. It is not improbable that the disease just described by Bourgelat and Bottani was this fearful malady. In 1771, it was exceedingly fatal in Brabant; from thence it advanced to Flanders, and thence to Picardy, Artois, Boulonnais, and Laonnais. The physician Dufot, in an excellent treatise,[3] tells us how it spread from infected districts, and penetrated the last-named province. 'This epizoötic disease,' he says, 'is contagious in the strictest sense of the term. A cow brought from Flanders communicated the disorder to other cows. The shepherds who, in these cantons, had been imprudent enough to enter those villages where the disease was prevailing in all its fury, carried it back to their own. The pestilential miasms attach themselves to everything solid and palpable, and the mere contact of these corpuscles gives rise to and perpetuates the malady.' It was so disastrous in its effects that the French Government was obliged to give it their attention, and to solicit the framing of precautionary measures by the Alfort College. The symptoms enumerated give no new features to the malady, already so well known. Dufot observes that *sometimes* tumours appeared under the skin; these sensibly augmented in size. He

[1] *Bottani.* Op. cit., vol. vii. p. 78.

[2] *P. Camper.* Brief aan den Hooggel. Utrecht, 1770. Leseen over de Veepest. Vorles. über das heutige herumgehende Viehsterben, aus dem Holländ. Von I. E. Lange. Copenhagen, 1771. Much that is valuable and interesting will be found in the following works, published in Holland during the previous five years:—*Alta.* Verhandelingen, &c., 1765. Noodige raadgevingen aan overheden en ingezetenen, &c., 1769. *Forsten.* Kort onderricht voor den Veehouder, 1767. *Van Doeveren.* Raadgevingen om de inentinge der Ziekte van't Rundvee, &c., 1769. *Vink.* Lessen over de herkaauwing der Rundern en de tans woedende Veeziekte, 1769.

[3] *Dr Dufot.* Mémoire sur la Maladie Epizoötique du Pays Laonnois. Laon, 1771.

named it a putrid-malignant fever, similar to that which attacks mankind. The rumen contained much food, covered with a tenacious and fetid mucus, and a blackish humour lined its internal tunic. The other compartments were speckled by black spots, and their lining membrane, which was easily detached, had a livid colour. There were some points of suppuration in the liver, and the gall-bladder was greatly distended. The lungs were collapsed, and covered with gangrenous-looking patches. The same kind of stains were noticed here and there on the pituitary membrane, the œsophagus, and in the intestinal canal; showing a gangrenous dissolution of these textures. His remedial measures are very silly; but with regard to those of a preservative kind, he counsels, as the most certain and the only safe proceeding, the sacrificing the first diseased beasts, and to take all other precautions to destroy or avert the contagion.

In Austrian Flanders Dr Le Cat, physician to the Empress, and residing at Ghent, was ordered to investigate the malady. The chief value of his labours consisted in the convincing testimony he produced to show that there was no other cause for the extension of the plague in that country than the communication, direct or indirect, of the virus from one individual to another, and from one place to another. He lauded all kinds of remedies for the cure of the sick, and among others *sulphur acid* in the water given them to drink. He came to the happy conclusion, however, that there was no other recourse to put an end to the contagion than killing all the diseased cattle; and the orders given on his suggestion were rigorously carried out in some villages where the disease had shown itself; four hundred animals were killed, and the epizoöty disappeared.

The erysipelas of pigs (*rothlaufes*), a form of anthrax, was very prevalent in Germany. Wirth testifies to the repeated appearance of this peculiar malady in Switzerland during the last century.[1]

Orræus says: 'At a later period, we made our general residence at Stoffeln, a village some distance without the city, and in

[1] *Wirth.* Op. cit., p. 110. *Scheibler.* Sammlung merkwürdiger Thierkrankheiten, p. 179. This writer terms the affection the Brown disease of Swine (*Die Bräune der Schweine*).

the midst of those vast vineyards which surround the metropolis of Moldavia; and at the first I collected a good many specimens of insects, but after a little while some infection came and drove them all away. Two years later I revisited Jassy, at the same time of the year, but under more favourable auspices; I then saw plenty of all kinds of insects. I believe in the truth of the following observation, which is altogether curious, and which is derived from the pharmacopola of Moscow, and is worthy of belief. For many years back, swarms of small ants crept into the receptacles where syrup was kept every summer, and they could never be extirpated by any artifice; but during the whole time of the plague not one appeared, though in the year after it had disappeared they all came back again. With regard to birds, it is related that the smaller song-birds which lived in caves died of the disease in their abodes, and that mice and dormice, however numerous they may have been in former times, had now vanished; for the truth of this, however, I cannot vouch. But concerning many birds, such as ravens, crows, magpies, and others, I am able to affirm, that I observed a multitude of them at Moscow as usual, but during this particular time, they became much scarcer, and I have rarely been able to see any flying about.'[1]

In India great clouds of flies were remarked, and in North America a strange invasion of black worms occurred. These were about an inch and a half long, and devoured corn and grass. They were generated suddenly in the Northern States, and so numerous were they that they covered a surface of country equal to two or three hundred miles. These creatures moved nearly all in the same direction, and when intercepted by deep furrows in ploughed land, they fell into them and formed great heaps. They disappeared all at once towards the end of June.[2] Rabies in dogs commenced in this part of the world at this time.[3] A tremendous shock of earthquake was experienced in the month of June at St Domingo, which caused much havoc, and destroyed a great part of the island. Famine followed this

[1] *Orræus.* Descriptio Pestis, &c., p. 63.
[2] New England Farmer, *art.* 'Infection.'
[3] *Webster.* A Hist. of Epid. and Pest. Diseases, 1800.

accident, and the hardship and misery ensuing was very terrible. It is said that during the earthquake innumerable fissures were opened in the ground throughout the island, from which mephitic vapours emanated, and that these produced the disease which followed.[1] An epizoöty of anthrax was a result of these misfortunes, and the unfortunate slaves of North St Domingo experienced a most awful famine; for the cod fishery entirely failed, and the Spanish Colonists, to provide sufficient food, were compelled to salt or smoke the flesh of all their cattle—dead or dying from the anthracoid malady. The consequence was, that a carbuncular epidemy appeared, and in less than six weeks more than fifteen thousand black and white people had perished. The plague did not cease until the consumption of the poisonous flesh or 'tassau' was interdicted.[2]

Pallas mentions that the Siberian anthrax (*Yasva*) was very prevalent among the cattle, and even attacked the camels, in 1755 and 1767, in the province of Isetsk. In 1768, it was wider spread than in any former period. With the Baschkirs of this province, the epizoöty attacked the camels before it visited the other domestic animals, and so destructive was it with them, that the breeding of this useful creature had to be discontinued. They also lost the greater part of their cattle. In 1770, during the visit of Pallas, the malady was raging in all its fury in the southern and eastern part of this province, especially where the country was open, and had marshes, salt lakes, or lakes of sweet water. The disease was almost annual, but in this year it was more than usually mortal. Pallas states that, at the same time, an epidemy raged in mankind. The disease usually manifested itself during the hottest months, especially when south winds prevailed; it ceased when those from the north began to blow; if these are late the plague may last until the end of the autumn. The mortality is then very great; all the horses and cattle perish at the same time; though the ravages are greater in some districts than in others, it is rare that men or animals are attacked in the interior of towns or fortresses. Men do not usually feel its effects

[1] *Lyell.* Op. cit.

[2] *Placide-Justin.* Histoire de l'Ile d'Hayti, p. 120.

until they go into the country, and particularly to damp regions, and the majority of animals are attacked at pasture. During the expeditions of the Russian troops against the Kirghis, it was discovered that in the low-lying deserts where lakes were, the disease lasted nearly the whole period of the summer heat. The day after passing through one of these places a number of horses were certain to die of the epizoöty, and then the whole began to experience its cruel effects. Pallas thought the epidemy reigning in winter in many places was a different one; it manifested itself by boils and ulcers in man and animals. He saw a disease of this kind near the Irtisch, in winter. The people called it the *Moravaia-Yasva,* or plague; but it was only a gangrenous esquinancy.

He imagined the principal cause of the plague was due to an insect flying in the air, and probably imperceptible to the eye. The disease attacked, by preference, men, horses, oxen, and cows, —sheep being safe, owing to the thickness of their wool. There were countries which, though near those most visited by the scourge, yet escape; they owed this immunity to the purity of the soil. It is rare that a year passes without an invasion on the Irtisch; whereas at Barabin, near Bourla, about a hundred versts from that river, it has never been seen, owing to its fresh air. All the horses from the fortresses are sent here to pasture. The symptoms were better noted in man than in animals. The disease showed itself, all at once, in the healthiest subjects of all ages, and of either sex. At first the skin became slightly reddened, and then appeared a small, inflamed, hard pimple, as if produced by the sting of a gadfly. These tumours appeared on covered, as well as uncovered parts, but most usually on the face in man, and the flanks and bellies of animals. They increased in size and hardness with remarkable rapidity, and in such a manner that a needle might be buried in the swollen part without any pain being felt. Externally, there was seen in the centre of the tumour a red or bluish spot, similar to that produced by the sting of an insect. If a remedy was not promptly applied, gangrene set in, and much injury resulted. Animals usually died, because the people were careless, and the tumour was late in making its appearance; but people, in consequence of timely treatment, nearly always re-

covered. From the symptoms, and the success of particular kinds of remedies, Pallas was confirmed in his opinion that the disease was due to a venomous insect abounding in these humid regions during the summer's heat, and which might have some affinity to Linnæus's *Furia infernalis.* The same means for keeping away insects also sufficed as a preventive of this plague; these were burning fires in the pastures, which the horses and cattle instinctively drew near as the evening set in, the time when they were most incommoded. Fires were lighted in pits near the doors through which these animals had to pass on their way to the grazing grounds; but it was superstitiously believed that these should be lighted by the living fire (*Tchivoï-ogon*), or that produced by rubbing two pieces of stick together. These fire-holes were seen along the borders of the Ouï and Siberia, and were looked upon with great veneration, fires being kindled in them wherever the epizoöty or epidemy declared itself.

In 1771, one of Pallas' companions travelling beyond the line of the Irtisch, remarks that the horse-epizoöty was prevalent at Oustkamenogorsk, and that large numbers had perished. He thought, nevertheless, that much of the mortality was due to the worms engendered in their stomachs, and which were seen in the *post-mortem* examinations; the best remedy was to make the horses drink, in the month of May, very salt water.

At Tschoumliazk, a large number of horses were attacked by the epizoöty, in which, says Pallas, they had a large and deep ulcer under the skin of the back, which contained a worm, but from the description given he did not believe this could be the cause of the Siberian disease.

The peasants of Obi used to be well off in possessing large droves of excellent horses and cattle, but during some years the epizoöty so common on the Irtisch showed itself in their country, and for five years had caused great destruction.[1]

A tremendous flood occurred in Virginia, which entirely swept away Elk Island, on which were seven hundred head of animals—horses, oxen, sheep, and hogs, and nearly one hundred houses.[2] About this time, according to Sinclair, 'began the dis-

[1] Voyages dans Plusieurs Provinces de l'Empire de Russie, vols. iii. iv.
[2] Scots' Magazine, vol. xxxiii.

ease among potatoes in Scotland, which for many years infested them.' In America, anginas and catarrhs prevailed.[1]

A.D. 1771. The epizoöty of rabies, which was noticed as having commenced last year in North America, was this year very prevalent in dogs and foxes, particularly in Boston and its neighbourhood. An epizoöty also began in the same locality amongst horned cattle, which did not cease until 1785. These events are thus noticed: 'About 25 years past there was an epidemic distemper among dogs causing a great mortality. In 1768 horses were generally affected with a disorder of the head and throat which proved fatal to many, and much injured the serviceableness of those that survived. About the year 1770, there were some instances of the rabies canina; happily but few dogs were affected, and but few persons were bit; their rage principally fell upon swine. In 1771, a mortal distemper prevailed among foxes, and greatly reduced their numbers; about this time, or not long after, a distemper appeared among neat cattle, which destroyed many, and has continued to this day. The distempers that befell these several kinds of animals were said not to have been known in the country before, more especially that which has affected neat cattle, and which has generally been considered as a new disease. It is commonly called the *horn-distemper*, and cows are more especially subject to it; oxen but seldom; bulls are said to be exempt from it, also steers and heifers under three years of age. It is a disease that affects the internal substance of the horn, commonly called the pith, insensibly wastes it, and leaves the horn hollow. The pith is a spongy bone, whose cells are filled with an unctuous matter; it is furnished with a great number of small blood-vessels, is overspread with a thin membrane, and appears to be united by suture to the bones of the head, and is projected to a point. This spongy bone, in the horn-distemper, is sometimes partly, and sometimes entirely, wasted. The horn loses its natural heat, and a degree of coldness is evident upon handling it; when it is only in one horn (which is often the case) a manifest difference between the one and the other will be perceived, and in all cases

[1] *T. Forster.* Op. cit., p. 169.

a want of natural heat will be apparent; wherever this is found, there is no room to doubt of the disorder being present; yet it is seldom suspected without a particular acquaintance with other symptoms that commonly attend this distemper, and for want of knowing these, the farmer has often lost his cattle, not even suspecting the evil. The symptoms are—a dulness in the countenance of the beast, a sluggishness in moving, a heaviness of the eyes, a failure of appetite, an inclination to lie down, an aversion to rise, and, when accompanied by an inflammation of the brain, a giddiness and frequent tossing of the head; besides these, the limbs are sometimes affected with stiffness like a rheumatism, and in cows the milk often fails, the udder is hard, and in almost all cases there is a sudden wasting of the flesh. (Neat cattle are subject to a disorder commonly called the *tail-sickness*, which is a wasting of the bony substance of the tail, and if not cut off or dilated as far as the defect reaches, often proves fatal. It frequently accompanies the horn distemper.) From the number of cows seized with this distemper in the space of a fortnight, a suspicion arose that the distemper was infectious; time, however, has shown that it is not so, at least, in any great degree, for it frequently happens, that among many cattle herding together, one of them shall have the distemper and the others remain in perfect health.'[1] The disease was cured by boring a hole in the substance of the horn, opening its cavity, and allowing the accumulated matter to escape. This malady resembles to some extent a disease which is frequent amongst draught oxen in France, where it is called *Catarrhe des Cornes*, but its usual cause is an injury. In this epizoöty it appears to have had no such origin, and I am unable to find another instance of this peculiar malady occurring in a general manner in any country.

After the pestilence in man at Moscow and in Wallachia, the 'distemper' of dogs is noticed for the first time in these countries. It is described by Orræus: 'I am inclined to believe that it is not incongruous to suppose that the plague amongst hunting dogs,

[1] *Cotton Tufts.* Memoirs of the American Academy of Arts and Sciences. Boston, 1785. Vol. i. p. 529.

which, so far as I can learn, was never before observed, followed the plague of men, and for many years, especially in the autumn, increased at Moscow and in this vicinity, and perhaps elsewhere, though there is little notice of it. The disease generally ran its course in this manner: respiration was difficult, with panting and protrusion of the tongue; the food was rejected, the eyes were inflamed and projecting; afterwards the animals became languid, and the white of the eyes was then scarcely visible. The glands of the neck, and even the head itself, were swollen; in other cases, the subaxillary or inguinal glands were involved. These swollen glands suppurated either spontaneously, or by the speedy application of emollient and maturating remedies; or there was a discharge of mucus, analogous to pus, from the nostrils in those which recovered; in others which had not these symptoms, death took place in three or four days. In some instances there was diarrhœa instead of these swellings, and the animals were unable to stand; if raised up, they immediately fell down again on their sides. When they became convalescent, they were often afflicted with paralysis of the hinder extremities, and either at last died of marasmus, or if young, after a long interval, gradually became well. This disease was so contagious, that if one was affected all the others were seized in a very short space; while other dogs readily carried it from these to other places. Men, however, were never affected by it, though they handled the sick animals. Also in Wallachia, after the serious plague of mankind, this plague of dogs was observed, as eye-witnesses informed me.'[1]

An epizoöty showed itself amongst fowls in Germany, coincidently with ergotism in man. Taube says: 'When, in the spring of 1771, I was continuing my journeys through the villages where there were still unfortunate sick people, I found such a general dearth of young poultry as had not been known since the French war. On the other hand, in those neighbourhoods where the ergotism (*Kriebel-krankheit*) was unknown, one heard nothing of this scarcity, or at least it was not so general. I will draw no inferences from this circumstance, but only add that every house-

[1] *Orræus.* Op. cit., p. 155.

wife complained that her hens would not hatch, and that they laid but few eggs. In most localities where ergotism raged, I know nothing for certain beyond the fact, that, at my request, two fowls were sent to me from the vicinity of Hankensbüttel, in both of which had been observed symptoms of spasms. They were really so affected, for at one time they would crouch down, and at another fall on their side, droop their heads, and scratch with their feet. After a time they would get up, but then they appeared cramped, and would stretch themselves out again. They fed well for fourteen days, and afterwards lived for eight days longer, but refused their food, became ill, and died on the fourth week.'[1] In Saxony, great numbers of geese died from epizoötic pityriasis. 'The weather in the early part of the year 1771 favoured the production of innumerable varieties of insects. The geese in many places suffered most, and there were great complaints, especially in Saxony, regarding the general mortality among these creatures. On close inspection of their skins, one found swarms of small lice which differed much from the so-called goose-louse, being of quite a distinct and more minute species.'[2]

Epizoötic aphthous fever appeared in Paris. Lafosse, jun., writes: 'On the 12th of January, 1771, I was called by a man named Antoine Louvet, living near the Barrière-Blanche, to see some cows which had been attacked by an epidemic disease, and which had already killed all those it seized. I opened some of the dead animals, and found the pharynx, œsophagus, and trachea covered with aphthæ. I also found the intestines gangrenous and full of liquid, which was of the same nature as the dysenteric dejections they had been passing five or six days before their death.'[3]

Pallas speaks of ovine small-pox as prevalent in Siberia.[4]

A.D. 1772. An epizoöty among cattle and sheep in Saxony. Anthracoid diseases in Auvergne and Champagne, as well as in Dijon, France. In the West Indian Islands, at St Domingo,

[1] *Taube.* Geschichte der Kriebel-Krankheit.
[2] *Rohlwes.* Die Federviehzucht. Berlin, 1821.
[3] Dictionnaire d'Hippiatrique, *art.* 'Aphthes.'
[4] Voyages dans Plusieurs Provinces, &c., vol. iv. p. 19.

an epizoöty broke out which was at one time supposed to be the Cattle Plague, at another gangrenous sore-throat; and Heusinger thinks it might have been a new outbreak of the anthrax disease, which may have lingered from 1770 to this year. 'A very afflicting case of destruction amongst cattle has occurred to augment those which have arisen since 1772; it is an epizoöty that, if we may so speak, has attacked all animals in succession, and has inflicted the most dreadful destruction on our colonies; these ravages are all the more cruel, because they have given rise, in some instances, to those suspicions which oppose the adoption of proper remedies for a disease that has already desolated entire countries in Europe.'[1]

Franque[2] shows that in the Duchy of Nassau, from this year until 1830, bovine epizoötic pleuro-pneumonia was scarcely ever absent.

A.D. 1773. This year was remarkable for the great numbers of mice observable everywhere.[3] The Cattle Plague still afflicted Holland, and scarcely had Flanders and Picardy begun to repair their losses in cattle, than the embers of this scourge, which had not in all probability been thoroughly extinguished in the two preceding years, or were, perhaps, stirred up by some fresh importation from Holland, blazed out anew, and with all its dreaded fury, in this year. It desolated a large portion of Flanders, especially all the district of Lille, and quickly the generalities of Soissons and Amiens were involved in the same unhappy fate; above all, however, the districts lying along the banks of the river Oise suffered most severely. The malady did not differ much, in its essential features, from the varieties and phenomena it presented in 1745.

In this year, the immortal Haller published his investigations into the nature of an epizoöty which had several times been observed in Switzerland. The great physician thought it was *the* Cattle Plague, but no one can read his description of this Swiss malady without surmising that it is a different disease

[1] *Moreau de Saint Mery. Chabert.* Instructions, &c., vol. iii. p. 261.

[2] *Franque.* Geschichte der Hausthierseuchen im Herzogth. Nassau. Frankfort, 1834.

[3] *Walter.* Forstphysiographie, p. 159.

and in all probability the bovine contagious pleuro-pneumonia. Such an authority needs no apology for being quoted here, especially as his preventive measures are worthy of notice, and would have saved this country a great loss had they been adopted in recent days.

I.

'The first thing necessary to know is the nature of the disease. This knowledge is not easily acquired, for often it does not manifest itself by any perceptible symptoms for a long enough period. The veritable cause of death is the work of nothing but corruption, which often affects the intestines; —corruption which is the consequence, and not the cause of the disease. It is necessary to attribute, without doubt, to the difficulty of recognizing this disease, the great ravages which it has made amongst the cattle of the most enlightened nations, before they knew its terrible character or the means to prevent its progress. In a general way, it is described as manifesting itself by a violent fever, by shiverings, by staring of the coat, by loss of rumination; but all these symptoms do not appear until the malady has already made deadly advances in the interior of the animal. We are told that, for a certainty, a beast taken out of an infected stable and transported to a perfectly healthy atmosphere, does not become sick until a month after it has been removed from the diseased locality, and that it perishes from the veritable contagion which, without doubt, had been concealed during the whole of this month in the body of the animal. It is also a fact that the diseased cattle jump about for some weeks with vivacity; that they give their usual quantity of milk; that they eat their forage with avidity; that they work in harness, and yet that they carry death in their intestines. The only sign of *pneumonia* ("pulmonie") which is to be noticed from the commencement, is a slight cough, which affects the animal notwithstanding all the apparent signs of good health. It is not for some days or weeks after the beast has become infected that fever shows itself by shivering and erect hair. The cough now augments, the animal moans, its strength diminishes, it cannot stand, and lies very often; it has a difficulty in breath-

ing; the pulse is frequent; the heat and the fever become intensified. It is now that it ceases to eat and to ruminate. The disease prevails during some days; the fever augments from day to day; the veins(?) beat with a force and a quickness which is astonishing; a gluey foam runs from the nostrils and the mouth of the creature; the tongue is hot; the breath is heavy and gurgling, and its odour is insupportable; the eyes are buried in their orbits; the horns become cold; a diarrhœa of a bad odour, and sometimes tinged with blood, and a thorough total sinking, terminate the beast's days. This diarrhœa does not always take place.

2.

'When we open the cattle after death, we find the lungs constantly and infallibly attacked. We might know this from the cough and the difficulty of breathing which precedes death. In all the contagions which have reigned at Sulens, Grandson, at Crassy, and elsewhere, the lungs have always been inflamed and attached to the pleuræ, and an aposteme often formed between the lungs and this membrane. I find the same observation in the best authorities who have written on the contagion, and particularly in the writings of M. Bourgelat, who has made the curing of these animals a particular study. In many cows the lungs are found gangrenous; in others they are filled with abscesses; and in others, again, there are vesicles filled with water mixed sometimes with pus; it is more rare to find tartarized or cretaceous matter. There is constantly inflammation and gangrene in the pleura, and we have never yet killed infected animals and found the lungs in the natural state. The cough being the first symptom of this disease, it is present in every animal affected. The lungs being constantly altered, it is clear that the disease of these is the essence of the contagion, and that it is with perfect justice the people term it, both in France and Germany, pneumonia. The alterations in the other viscera are not so essential as those in the lungs. It is common, nevertheless, to find the stomach inflamed and gorged with food. It is scarcely altered when the animals are killed shortly after the commencement of the disease; but when they have been slaughtered in the last stages,

or when they have died, the first compartment is inflamed, the food is found little affected by digestion, or it may be even rotten. The second compartment is equally inflamed, and filled with forage which is undigested. The third compartment suffers the most, and it is very often found inflamed and gangrenous, the food in it being extremely compact and dry, and sometimes rotten (*pourri*). The fourth, or true stomach, is frequently inflamed and gangrenous, but the food is not hardened.

'From the first days of the malady the beast has eaten and ruminated, and as it would not be able to maintain either of these functions if the stomach had become inflamed, it is very evident that the corruption of the stomach is a consequence of the fever and the putridity of the juices of the beast, and that it is not the cause of the disease. The animal has been infected, and the stomach has maintained its health for a number of days, and it is only by a corruption of the humours that it is found vitiated. M. Bourgelat has found the stomach in the same state of inflammation, and the same engorgement of forage, in every beast mortally attacked, no matter what acute malady it may have been.

'It is the same in the intestines, which are often found inflamed, and even gangrenous; and this corruption appears to be the effect of the rotting of the food which the stomach has passed into the intestines, and which attacks them.

3.

'An extraordinary dilatation of the gall-bladder is frequently met with, and yet it is only a somewhat constant accident of the contagion. It may arise from a retention of the bile in the cyst, because the stomach having lost its function, the bile is not evacuated. We may infer that this is the cause, for men who have died of hunger, or were so injured by some violent disease that they could not take food, have usually the gall-bladder dilated. Sometimes, also, we have observed an emphysema under the skin, often on those parts on which the animal has lain; this is only an effect of the putrefaction (*pourriture*). We have the same effect exhibited in the fat, which is often in a corrupt state in those animals that have died of the contagion; yet

the flesh of those beasts cannot be constantly vitiated, for in those countries where measures of police are neglected, the poor people eat the flesh of infected oxen. We have scarcely observed the odour of the skins, but they have been found of a softer texture than in an animal in health. In other countries, abscesses have been scattered under the whole surface of the skin, and some doctors have regarded them as a salutary evacuation, but nothing similar has been observed in the contagion of this country. It is more common to find a yellowish fluid in the cavity of the chest, but this is not constant; and we have opened cattle which had one side filled with this fluid, and none on the other. The country people have distinguished two kinds of pneumonia, the *dry* and the *humid*, but there is no foundation for this distinction.

4.

'The true nature of a disease is known by the accidents which accompany it in its duration, and by the changes which we observe on the autopsy of the animal, when compared with the organs of the body in health. But the essential features of the disease ought to consist in the symptoms which are manifested from the beginning, and which have continued during life; and in the marks of corruption in the interior which are the actual causes of these symptoms, it requires care not to be deceived by these accidents, which are a consequence of the corruption of the humours, and are only most apparent in the later stages of the disease. It is believed that the contagion amongst the cattle is an inflammatory fever; a malignant fever; a fever accompanied by an eruption on the skin; as well as an inflammation of the stomach. The ancients have got very near the truth, and the vulgar have known the nature of the disease better than the learned. It is evident that it is a disease of the lungs, which commences by an inflammation, running often into gangrene, at other times into abscesses, and which terminates in phthisis. It is very astonishing that amongst the number of modern doctors who have written on a contagion existing for so many years, scarcely one has observed that the seat of the disease exists in the lungs, or even that these were attacked.

5.

'The doctors have established their remedial measures to cure this disease, on the notion that they knew its nature. Those who look upon it as an inflammatory fever recommend bleeding, and remedies of a soothing and cooling kind; those who admit a corruption of the blood have ordered febrifuge and stimulating remedies, and those who consider it a putrid fever counsel the administration of acids, and in Brandenburg wild apples have been recommended as a specific. Others, again, have proposed quinine, and others mercury, while the people have recourse in general to incongruous compositions, and to old-fashioned recipes. The ancients looked much to setons, to the root of hellebore passed through the skin, so as to establish a long suppuration. But it has been discovered by sad experience in Holland and in England that these remedies are impotent; all hope of curing this disease has been lost, and people are content to mitigate it by inoculation. We pass in silence the pretended preservatives by which it is supposed animals are insured against the contagion, and to which no man of sense would give any confidence, seeing that they are useless against the plague, the small-pox, and other contagious diseases.

6.

'A long experience has taught us that remedies are useless against the contagion. The beginning of the disease is nearly imperceptible, and when the symptoms are manifested the cure has become almost impossible. The use of remedies is otherwise dangerous, for the infection is really communicated by the breath and the exhalations; we have a proof of this in the foul smell attaching to the clothes of people who look after the diseased beasts. We cannot hope to cure in a day a disease of so serious a character; and thus the diseased creature which lives in the same stable with other cattle, and feeds and drink with them, may infect them during the time we are unsuccessfully trying to cure it. These same exhalations may also lodge in the clothes of those who go about them, and thus become dangerous to the animals yet in health.

'We cannot, then, hope for any good from remedies. For more than two thousand years, an infinite number of the most learned men have given their most constant attention to observing the effects of medicines on mankind. We know well enough the value of simples, the properties which they have of stimulating or evacuating, and their dose. But we have not nearly the same knowledge to guide us when we deal with animals: few talented persons have observed their diseases; the art of curing them has been left to men of low condition, who have no knowledge of the anatomy of the lower creatures, and who have not informed themselves by the study of nature, or of good authors. The cattle-doctors invariably follow the same routine traced by the ancient veterinarians, and their science consists of divers receipts, which they have found amongst the papers of their predecessors.

'The structure of the stomach of cattle is very different from that of man; in general the envelopes of their nerves are much more thick, the sensations less active, the pulse less frequent, the arteries more hard, and the heart less irritable. All these peculiarities change the effect of remedies in animals, in a way quite different to man; and it is only within a few years that convincing proof has been afforded of the difference between the effect which a remedy has on man and animals. The safran of metals is a violent emetic for human beings; in the horse it only increases the transpiration; a dose of the glass of antimony, which produces violent vomiting in mankind, simply purges the horse; no poison will make a horse or a cow vomit. Because the effects of medicines, therefore, on the lower animals are so little known; because scarcely any one has observed closely enough the diseases of cattle, or given certain rules for the exhibition of proper remedies; because the use of remedies can only tend to spread the contagion—for all these reasons it is prudent to abstain from a dangerous tentative which promises but little, and which may have the worst effects; and it is infinitely preferable to oppose the disease by means which are more certain and commendable.

7.

'We begin by disabusing the public of the idea that the pneumonia (*la Pulmonie*) is not a contagious disease. This outrageous idea even comes from some *savants;* there are those, too, who rob the plague of its contagious power. I do not pretend to say that the skin of an infected beast preserves its contagious properties for a long time after death; experiments on this matter, which deserve attention, have been made in France. It is necessary, nevertheless, to remember that the plague attaches itself by preference to the wool and the hair of animals, that it may be transported by these matters, and that they will spread the contagion to other towns and countries free from the contagion. It is, then, possible that the empoisoned exhalations of the diseased beast attach themselves to the hairs of the animals which go near it. It is at least certain in our country, that as often as the disease is manifested amongst cattle, and when it has been traced to its source, it has been found that a beast which had been purchased in the market of some suspected place, or which had been brought from some infected locality, has carried the contagion with it to the new centre. Sometimes, also, the cattle of our regions have been depastured with those of a neighbouring infected country. It is very probable that, at other times, the air of the infected mountains has spread the dangerous exhalations over our country. We believe we have observed that the healthy cattle which had smelled those that were diseased have shown, a few hours after, traces of the contagion. It is known that the ship from Sidon brought the plague to Marseilles, and that the bull which was taken from Hungary to Padua in 1711, took with it the fearful contagion which first ravaged Italy, and then nearly the half of Europe. It thus appears that the plague of man and the Cattle Plague take their origin in hot countries, that they can infect temperate regions, and that they are gradually destroyed during the cold of some rigorous winter. That which is yet a better proof that the pneumonia is perpetuated by infection, as the plague is, is the manner in which we can confine it in suspected places, and by cutting off all communication between the stables in-

fected and those which are not. If this malady was generated spontaneously, like the ordinary fevers of man, we would in vain barricade the infected stables, in vain we would slaughter the cattle of a village, and it would be useless to isolate the mountains by barriers and by guards. All these precautions would not keep away a disease which has its origin in the blood itself of the healthiest cattle.

'This contagion, however, does not spread very far, and it does not infect a column of air for any great distance. If the air were infected—if it was able to carry afar the poison of the disease, the barriers and other precautionary measures of man would be unavailing. In this there is the greatest resemblance between the disease of cattle and the plague of man. The monks and nuns of Marseilles were preserved because they kept their convents closed. The air was not, then, the cause of the disease, else the closure of the convents would not have prevented the pestilence from entering. The police have often confined this disease of cattle to a stable, or a small number of stables, and so prevented others being attacked.

8.

'It follows from all this, that, on the one side, the disease arises from infection, and on the other, that there are no hopes of a cure. There only remain, then, those resources which we may employ to prevent infection, and for confining to the smallest limits the loss which might happen when animals are first attacked by this poison. These efforts should be directed to prevent the infection being communicated from other countries to ours; or if it should have penetrated, then to stop its spreading from the diseased to the healthy. Above all things, then, we ought to hinder the entrance of cattle from a country where the pneumonia nearly always reigns, sometimes in one district, sometimes in another; and these precautions ought to remain in force at all times, and be perpetual in regard to those countries where the police is not strict, and from which the disease might be carried to ours. The danger will be always great if the trade in cattle is carried on without inspection. This precaution is all the more necessary against the countries whose rulers care

little for the welfare of the people, and in which the people have no confidence in the administration. The poor people of a country, despairing of being aided by the government, conceal with extreme care the existence of the contagion; to evade more onerous consequences, they even inter the cattle in their stables, and it is very natural that they should endeavour to sell at a modest price those beasts which incur great danger to their neighbours. In the countries where the ruler has a paternal feeling for his subjects, where he is always disposed to soften their losses, where he generously takes into account the expenses necessarily attending precautions, and where he gains the confidence of the people, the inhabitants at once denounce the disease, submit to the necessary restrictions, and rely on the wisdom of their king for their preservation, and the amelioration of their hardships. A wise government ought to prevent the contagion, and not wait until it has invaded the country, but check it at its frontiers, where it is easy to do so. The police ought, then, even in times of the greatest apparent security, to take care that no animal shall become diseased without responsible people being informed. Even in ordinary times every animal purchased or sold ought to be vouched for, and should be marked on the horn with a particular stamp for each village, which mark ought to be renewed whenever it becomes effaced; so that, by this proof, we may know what village it comes from, and assure ourselves of the health of that village. For the same reasons, no cattle should be admitted to fairs or markets, sold or exchanged, without a voucher being given of perfect health, impressed and signed by the authorities, testifying to the health of the animals and that of the place from whence they have come. For this purpose inspectors are necessary. They should destroy cattle which are brought without attestations, and give the flesh to the poor; there are but few cases when less rigorous measures are needed.

9.

'Notwithstanding all these precautions, the extent of the frontiers, the want of care of our neighbours, the exhalations from the infected mountains where the disease is raging, the greed of gain, and the desire to purchase at a low price, as well

as the other failings of a police so difficult to enforce in human society, are all causes which may aid the contagion in insinuating itself into some village or on some mountain. In this unfortunate case, it only rests with us to smother the flame in its first commencement, and to prevent its extension. Every person who may have any knowledge of the disease, or even any suspicion of its existence among cattle, should be held liable to a heavy penalty if the nearest magistrate is not at once informed; also when a non-suspected beast becomes diseased or dies, the proprietor or other instructed persons should give information, and the proper authorities should then pass on the tidings. Whoever conceals any suspected case should be severely punished. Every precaution should then be made to extinguish the disease.

10.

'The first of these precautions is the prompt separation of the diseased beast. So long as it is suspected it ought neither to be allowed to drink, feed, pasture, or dwell with the healthy. It should be kept in a separate stable, or in an enclosed paddock, and those who attend it should wear clothes appropriate for that purpose—never even approaching healthy animals. The trough out of which this animal drinks ought not to be used for the healthy, the dung should not be spread on the ground or carried away, but should be buried in deep pits and well covered with earth, and these places should be surrounded by palings, so that no healthy beast may be able to smell it.

'When the infected animal has been killed, or when it has died, it is necessary to aerate the stable for three months at least, and remove and burn the thatch and all the wooden moveable articles; to dig up the ground to the depth of a foot, and replace it with other earth, and cover the whole with lime. The healthy should not go near the forage which the diseased may have been eating, and which might be infected by its breath,—though it may be given to horses. Every animal dying of the disease should be opened in the presence of proper persons skilled in the veterinary art, and a report of the post-mortem appearance should be made. If the disease is made out to be a non-contagious one, the owner

may be permitted to use the flesh and remove the skin. But if there is found the slightest cause for suspicion in the lungs, the skin ought to be cut crosswise, and buried in a grave six feet deep, which should then be filled with lime. Palisades should be fixed around it, so that no animal may come near. If the disease is really a *pneumonia*, it is preferable not to doctor it, but to kill without delay the first animals which, from their cough, would lead one to suspect the disease, or those which have been in the same stable with the sick; because we may set down as lost, without exception, every animal which has been in a house with a *pulmonic* beast. Experience has only too often demonstrated that they take the disease one after the other, and all die. This operation shall be performed in the same way, and with the greatest care, when animals have perished from a suspected disease without its being decidedly contagious. Their flesh may be used, and the skins preserved, provided they are at once carried to the tanners. The skins of the really diseased must be cut and buried with the bodies in a deep pit full of lime. When the loss is considerable, the Sovereign usually causes a collection to be made for those proprietors whose cattle have, for the sake of security, been sacrificed for the public good.

II.

'When many stables are infected in the same village, the danger is yet greater, and it is here that it is necessary to redouble our efforts to prevent the spread of the contagion. All the infected stables should be carefully closed, and excluded from all communication with the watering-places and the pasturage; and in serious cases, to make more certain, we should kill all the animals which have been in the infected places, no less those in apparent health than those in which disease is manifest. We are driven to this severe recourse, because we never can be assured that those animals which have come out of suspicious places have escaped the contagion. This apparent cruelty is the only means to be employed for preventing the contagion from penetrating into other stables and into neighbouring villages, and from spreading over the whole of a country.

'The case is yet more dangerous when the contagion mani-

fests itself on a mountain where a certain number of cattle find their subsistence during the winter. It has happened that the cattle of the plains have remained in health, but that those on the neighbouring mountains have been infected, and thus the herds of the republic have been encircled by the contagion. This has occurred sometimes on the mountains of Petite Bourgogne; and though we have admonished the inhabitants of the Valley of Lake Joux, they more than once have been found in the midst of the infected villages of Bourgogne. In these unhappy circumstances, it is to be recommended that the mountain-passes should be closed, and all communication cut off from the infected pasturages. Inspectors ought to make a visit every fifteen days to the mountains where the cattle belonging to the subjects of the State are kept, in order to examine with great care if any beasts are in a suspicious condition, or if, without exception, they are in health. When the time arrives that these animals should be brought from the mountains after they have passed the summer in Bourgogne without being infected, the proprietors should be compelled to keep them for six weeks on the lower hills—which are isolated, and separated, so as to prevent their mixing with the cattle of the country. These places should also be visited every fifteen days, and it is only after this quarantine, and according to circumstances, that they be permitted to enter the valleys when we can assure ourselves there is no danger.

'In those instances where the infected mountains of our neighbours abut too closely on our own, these last should be most strictly guarded, and it should not be for less than a year after the disease has disappeared that any communication be allowed; as experience has amply demonstrated that cattle not suspected of disease have been attacked by the contagion by grazing on mountains in the neighbourhood of those infected.

12.

'When, unfortunately, this contagion has penetrated from the neighbouring mountains to our own, the danger is extreme. The number of cattle which pasture on a mountain is much greater than in a stable, and by these all mixing in search of

food, we have not the power to separate them. They often drink at the same pond, assemble at the same châlet, or at any rate in a number of châlets, and there is every facility for their roaming from one mountain to another; in this way they may spread the infection. The poisonous breath of the diseased attaches itself to those in health, clings to their hair, and empoisons the pasturage. It is absolutely necessary, then, to act with a mountain where there is disease as we would a stable in which the contagion existed; but it is to be remembered that it is more easy to close and barricade a stable than a mountain. There remains nothing to be done in these unhappy circumstances, than to kill all the cattle on the infected pasturage,—those yet in health and those in which the disease is recognizable,—in order to keep the adjoining mountains safe. It is the measure which has been practised more than once with success; the loss has been doubtless considerable, but the subscriptions gathered in the country, added to the bounty of the Sovereign, have contributed to solace the unfortunate owners. There is to be observed in the performance of this melancholy duty a natural difference between the cattle in health and those diseased: we take the flesh and the skins of the first, and bury the latter entire and in lime. Sometimes we are obliged to exercise a greater degree of severity by destroying the hogs which, according to the custom on the mountains, feed with the cattle. The contagion which destroys the oxen does not affect either pigs, sheep, or horses; but it is always to be apprehended that these may carry some of the contagion or the infected breath to these animals, and may thus spread the disease.

13.

'It is only by these precautions, which should be constantly in force, that it is possible to confine the contagion to a village or a mountain, and to keep the country free from infection; from time immemorial no contagion has ravaged more than a very small district of our land. It is not doubtful, therefore, that the same measures would suffice equally in stopping the progress of the contagion in other countries; and they might be yet more easily enforced, because in these kingdoms there are troops who might be usefully employed in cutting off com-

plete communication with the infected regions. But it is essential that all these measures should be taken at the very commencement of the contagion,—without delay, without hesitation, and without stint or reluctance. When an entire country, such as Holland, is infected in thousands of villages and stables, no human power can suffice to root out the contagion.

'Even now it reigns in Holland, notwithstanding the inoculation and the many remedies employed. The milk necessary is furnished by the cows which have had, or are proof against, the disease. It really appears that the malady diminishes, and as if it would cease of itself, like every other foreign disease; the plague, even, dies out after a certain time.

14.

'The glossanthrax (*surlangue*), or ulcer of the tongue, is yet more contagious than the *pneumonia;* the cause of this abscess is carried even by the air, and the disease traverses an entire country in a few days. It is truly a mortal affection when the necessary precautions are not enforced, but it is easily cured. It suffices to rub the tongue with a spoon, the edges of which are a little sharp, and to wash the abscess with wine. The glanders of horses is contagious, and is often seen in this country. There are employed against it the same measures as are used for the pneumonia; the diseased horses are destroyed, and the stables are closed.

'Splenic apoplexy (*maladie de la ratte*) makes great ravages in very hot summers; it is a burning fever accompanied by gangrene of the heart, but it is not contagious,—no more at least than dysentery (*flux de sang*).

'The manner of replacing the cattle in a country where the contagion has destroyed all, does not enter into our plan; we have never been reduced to that unfortunate state, and we refer the reader to the wise counsels which Lancisi had published.'[1]

It has been already stated that the disease described by

[1] *Von Herrn. Alb. Haller.* Mémoire sur la Contagion parmi le Betail. Abhandlung Von der Viesuche. Berne, 1773.

Haller as existing in Switzerland, was in all probability the contagious pleuro-pneumonia, to whose ravages at the present time we are so painfully accustomed. Nevertheless, the existence of this malady, concurrently with the Cattle Plague in different countries, has been remarked on several occasions, and has not unfrequently given rise to pathological mistakes of a serious kind. It is also worthy of notice that Switzerland, owing greatly, no doubt, to its physical configuration and geographical position, as well as to the intelligence of its people, has been largely exempted from the desolating visitations of the Cattle Plague, which was at this time thinning the herds of Flanders, Picardy, Soissonnais, and Champagne. Hainault was the first to experience its ravages. It appeared at La Grosier, a village in the neighbourhood of Landrecy, in the domain of Bouchain. It devastated a part of Flanders, particularly about Lille, and soon all the generalities of Soissons and Amiens participated in the destruction; more particularly were its dreadful effects remarked on the banks of the river Oise. It appears that in Hainault, as well as in Picardy, there were many vague conjectures as to what had caused the malady; but the prevailing opinion was that it had been brought by a sick cow which had come from the Low Countries, where a similar malady was then raging. According to M. Dufot, this was the way in which it had been conveyed to Soissons. In these provinces, it offered the same varieties, and the same phenomena as the epizoöty of 1745 did in different parts of Europe, with some few exceptions.

The different authors who wrote on the Cattle Plague of this year describe its symptoms and spread very accurately. In Hainault, where it was observed by M. Raulin, it was remarked that the skin eruption was more frequent than elsewhere. 'The morbid matter of the disease is *sometimes* thrown out on the skin, in the form of inflammatory pustules (*boutons*). This eruption appears from the fifth to the seventh day, and particularly about the ears, the neck, the udder, and the inner sides of the thighs: that is to say, on those parts of the skin where there is least resistance, and where its texture is thinnest.'

The most striking proofs of its contagiousness were afforded,

and the curious ways in which the poison could be carried about were often reported. For example, at Morcourt, a village near Paris, the dog of a labourer followed some coachmen who were driving their carriages to the village of Fonsomme. In passing by the farms of Courcelles, where nearly all the cattle had perished, but had not been deep enough buried, this dog stopped when he perceived the smell of their flesh, scraped the earth away, made a repast off them, and then returned to his master. Pressed by thirst, he drank some gruel intended for calves, and then went to sleep on the dungheap. Some days afterwards the calves became ill and died. The contagion was communicated to the cows, who shared the same fate, and the malady soon spread over the whole of the village. Only one farm, belonging to a labourer, and containing twelve cows, escaped; but this individual took every precaution to keep away man and beast from his stables, and did not allow his cows to leave the premises.[1]

Paulet says: 'If we examine all the symptoms enumerated by the various authors, and compare them with those reported for the epizoöty of 1714 and 1745, there can be no difficulty in establishing their identity, even with their variations. The lachrymation, salivation, and nasal discharge; the prostration, stupor, dulness, refusal of food, and apathy; in some cases an eruption on the skin, in others none at all, as Lancisi and Courtivron remarked; in the majority, a cough preceding all the other symptoms; emphysematous tumours appearing in large number towards the termination of the disease; a perceptible alteration in the dejections, which were sometimes liquid, and nearly at all times sanguinolent and fetid; in all, without exception, a hard and dry mass of aliment in the stomachs, particularly the third compartment; lastly, the same course in communication, the same violence in the symptoms, the same periods, the same phenomena in its progress, and the same difficulty in

[1] Besides M. Raulin, whose Memoirs are only to be found in various journals, the writers who have best described the epizoöty at this time are: *M. Dufot.* Mémoire pour préserver les Bêtes à Cornes de la Maladie Epizoötique, &c. Soissons, 1773. The Mémoire du Sieur Maillard sur la Maladie Epizoötique, &c. Amiens, 1773. *Nocq.* Observations sur la Maladie Epizoötique que regne dans plusieurs Paroisses de l'Election de Saint-Quentin. St Quentin, 1773.

treatment—all prove it to be the one malady. If there is any advantage, any light to be derived from the different observations of the authors, so as to remedy the inroads of the scourge, which in consequence of the climate, the season, the seat of the virus, the state of the humours, the circumstances in which the animal was placed, and perhaps, also, from treatment, was sometimes eruptive, sometimes catarrhal, at other times dysenterical; —if there is any real benefit to be derived, we repeat, it is particularly that which may make us acquainted with the earliest symptoms of the disease, so that we may either promptly protect the healthy, or treat them before it shows itself.

'This primary condition is difficult to discover, even for observant eyes, as M. Dufot remarks. Nevertheless, the general apathy, as well as the dulness, announce the disease; and if we add to these two signs the diminution of milk, the flaccidity of the udder in the cow, and particularly a cough, with acceleration of the pulse, we will have the principal signs which precede the malady, and which are essential in every case for its recognition. With regard to the prognosis, this is always directly related to the symptoms. M. Dufot remarks, that when the intestinal excretions were abundant (without being bloody), the animal did not die. The morbific matter has only three favourable issues to escape by,—either from the nostrils, the intestines, or the skin; and these two last being the most proper to the advent of a favourable crisis, they are the more or less fortunate according as the humour is removed by them in a great or small quantity, in whole or in part, and of a good quality. The issue by the skin is always the most advantageous for a critical movement, brought on either by nature or art. . . . . The epizoöty in Picardy offered some minor features relative to the communication of the malady, and to the general and particular care necessary to preserve the cattle. In such circumstances, there is a class of men in the country who are as dangerous as the malady; these are the petty cattle-dealers, who run from one farm to another nearly all their time, with suspected beasts which spread the disease. Every means should be taken to expose abuses of this nature. It was proved that one of these men who drove about two beasts in a diseased condition, halted with them in

the pastures of a farmer who was from home, and so infected the place that the owner saw all his cows die in a short time after they had been in it. It was by similar means that the scourge was carried from one province to another. As a rule, too much attention cannot be paid not only to cattle-dealers, but also to all those who visit the diseased animals and handle them. The disease passed in this way from Picardy to Champagne, and extended to Charleville. A farmer in this town, it was said, only saved his stock by opposing a vigorous resistance to the entrance of those who had been visiting at suspected places. Whether this was really the case it would be difficult to decide; but it is certain that, in guarding his cattle from all external communication, he was the only one who escaped the ravages of the malady. It is not yet decided whether, in certain cases, the advantages to be derived from the visits of scientific men, amateurs, and farriers, &c., are capable of counterbalancing the dangers to be apprehended from their carrying the contagion. On the one hand, it is essential to know how many animals are affected, in order to treat them or to stay the progress of the contagion; and on the other, it is not less essential to reckon on the danger of visits and infection.' 'It ought to be particularly noted that this question is only applicable to a disease like the present, which is recognized as very contagious, very deadly, nearly always incurable, and for the suppression of which we must depend but little on the resources of art. In other cases,—those of diseases springing up amongst us, and whose progress we can arrest by care almost as soon as they manifest themselves,—it is the interest of the State, as well as of individuals, that specially educated men be directed to the infected places to give prompt and convenient assistance, or to issue instructions for the guidance of the country people, and to form a good sanitary police to take precautionary measures.' Some excellent examples are given by Paulet, showing that, by simple precautions, several parishes escaped the contagion. He adds: 'They were not so fortunate in Artois, for the malady there attacked successively fifty villages, so that in 1774 four-fifths of the diseased cattle were lost.'

CHAPTER VIII.

PERIOD FROM A.D. 1774 TO 1800.

A.D. 1774. In September, a severe earthquake was experienced at Altdorf, in Switzerland. Epidemic convulsions were prevalent in France, and an analogous disease was very general in America. In Scotland, the crops were mildewed, and America suffered in a similar manner. At Cape Cod, a bed of oysters perished from disease; and at York Island, in the United States of America, the lobsters mysteriously disappeared.

The epizoöty of anthrax which broke out at St Domingo in 1772, extended itself this year to Guadaloupe, and attacked not only cows, but horses and other animals; people were even affected with it by inoculation from the cattle.[1] An epizoöty appeared among geese on the banks of the river Meurthe, Lorraine, where in a very short time six hundred of these creatures died from diarrhœa and vertigo.[2]

In Brittany, during the summer, anthrax was common, and in December it prevailed in Gevaudan. In many instances it was transmitted to man.[3]

The Cattle Plague still prevailed in Holland, owing to the attempts to cure it; so that that country was a standing danger to all those which had any dealings with it.

[1] *Bertin.* Relation de Quelques Accidens Extraordinaires observés à la Guadeloupe, &c. Paris, 1775. *Paulet.* Op. cit.

[2] Gazette de Santé. February, 1774.

[3] *Paulet.* Op. cit.

In the month of June, the Cattle Plague, which, during the preceding year, had entered Flanders and Picardy, broke out rather suddenly in August amongst the bovine species in the South of France, a short distance from Bayonne. It was universally believed to have been introduced in fresh hides that had been imported from Zealand, in Holland, or from Artois, and which were discharged at Bayonne. These were conveyed by carriages to the place where the malady began, and which was near some tanneries. Since the visitation of 1740, the southern provinces—then, as now, containing numerous herds of cattle—had been spared from its devastations. But now it obtained a serious footing, and from Bayonne, as from a centre, it extended; and soon, meeting with the diverging circles from the other centres, it occupied almost the whole of France from the south to the north. The provinces in the west—La Vendée, Brittany, and part of Normandy—alone escaped. In some of the southern provinces, the number of cattle destroyed was so great, that after the epizoöty had disappeared, there were scarcely sufficient left with which to cultivate the soil. The number that perished was estimated at 150,000, and their value at 152,000,000 francs. The disease has been well described by the physicians Vicq-d'Azyr and Doazan, by the veterinarian Bellerocq, and by others. To notice the writings of all these would occupy too much space, but to those interested in the subject, I subjoin the titles of the various works; they will be found to contain much information and attentive research.[1] In the mean time, it may

[1] *Secondat.* Mémoire sur les Maladies Pestilentielles des Bœufs, 1775. Observations sur l'état actuel de l'Epizoötie aux environs de Toulouse. Journal de Physique, 1775. Consultation sur le Traitement qui convient aux Bestiaux attaqués de l'Epizoötie. Journal de Physique. *Grignon.* Histoire de la Maladie Contagieuse qui s'est declarée au Hameau de la Neuville en Champagne, 1776. *Bacherat.* Dissertation sur la Maladie Epizoötique du Betail, 1777. Mémoires de la Société Royale de Médecine. Année 1779. *Paulet.* Maladies Epizoötiques, vol. ii. p. 117. I have not thought it necessary to analyze all the reports which were made on the disease in this part of France. The following are the principal: *Doazan.* Mémoire sur la Maladie Epizoötique regnante. Bordeaux, 1774. *Vicq-d'Azyr.* Observations pour Préserver les Animaux Sains de la Contagion, &c. Bordeaux, 1774; and Recueil d'Observations. Paris, 1775. Also, Instructions sur la Manière de Désinfecter les Villages. Paris, 1775; and Exposé des Moyens Curatifs et Preservatifs qui peuvent être employés contre les Maladies Pestilentielles des Bêtes à Corne. Paris, 1776. *Bellerocq.* Recherches sur la Maladie

be useful to glance at the results of Vicq-d'Azyr's investigations. The disease spread rapidly in Agénois, Condomois, the country of Auch, Bordelais, Médoc, Guyenne, Gascony, and elsewhere, and its ravages were particularly severe during the years 1774 and 1775. Its resemblance to the malady which, since 1711, had successively decimated the cattle in Italy, France, Germany, England, and other countries, was complete, and the relative differences of climates, seasons, or temperament had apparently but little influence on its character. Vicq-d'Azyr, nevertheless, thought he had discovered some varieties. For example, in the country of Auch, tumours were often observed along the spine; in and around Boulogne the skins of the affected cattle were covered with a kind of mange; in Condomois, aphthous eruptions were sometimes manifested in the mouth; lastly, sometimes, and without any perceptible causes, the disease was much less diffused in some villages than in others often only a league distant. The disease was nearly always beyond the resources of art, and the best-devised remedies had only effected a small number of cures. And these cures had not been made without danger; for Vicq-d'Azyr was a witness to the fact of a calf that had been saved by careful nursing, and which, after its cure, had communicated the disease to many cows, which perished after it was quite well. To the dangers, then, of a disease nearly always incurable, were added those of a malady highly contagious, and the transmission of which it was nearly always impossible to prevent. In these unhappy circumstances, recourse was had to an extreme measure, in order to destroy the contagion, and with it the malady. All the diseased and suspected cattle were killed. This measure, which had been proposed by Lancisi, enforced in England in 1714, and in 1771 in Austrian Flanders, and had been recommended in 1773 by Dufot, was carried into execution in 1774 and 1775, in consequence of the recommendation of Vicq-d'Azyr and the veterinary professor Bourgelat. A decree of the 18th of De-

Epizoötique, &c. Bordeaux, 1744. Avis rédigé sur les Mémoires du Directeur de l'Ecole Vétérinaire. Pau, 1744. *Faur de Beaufort.* Consultation sur la Maladie Epizoötique qui règne en Guyenne. Bordeaux. *Prat.* Gazette de l'Agriculture. February 28, 1775. Consultation de l'Université de Médecine de Montpellier, 1775.

cember, 1774, and another of the 30th of January, 1775, ordained that one-third the value of the beasts sacrificed should be reimbursed to the owners.

During the course of this epizoöty, Vicq-d'Azyr made a great number of experiments and observations, the chief results of which should not be overlooked. From these it was inferred that the disease could scarcely be communicated by means of fresh hides taken from the diseased beasts, as these had been used over and over again on the backs of eight cows at four different periods without inducing the malady in them; and skins steeped in lime did not communicate the contagion. The infected clothes of men, and which had been worn in veterinary infirmaries, had given the disease to three animals out of six. The gases from the intestines,—collected when dead cattle were opened,—enclosed in bladders and introduced into the nostrils of many healthy animals, have caused the manifestation of the disease in about ten, twelve, or fifteen days. Bread steeped in the blood or the bile of an infected animal has communicated the malady in five, six, or eight days. Attempts to transmit the infection by means of frictions, either with the hands impregnated with virus, or with hay, or infected skins, were ineffectual. Inoculation had been attended with unfavourable results, as nearly all those experimented upon died, and those in which it was most successful were young animals. When the disease assumed a less deadly form, then inoculation was more satisfactory in its effects. Inoculation had been tried by Layard, in England; Camper had before-times largely practised it in Holland, and the doctors Koopmann and Sandifort had repeated these tentatives in the same country. The operation, of course, was employed with the intention of communicating to the cattle a more benignant form of the disease than that which is developed naturally, and thus to secure them against the chances of another attack. But, as we have seen, inoculation was far from being successful in any country in which it has been tried, and with Vicq-d'Azyr nearly all those inoculated succumbed to the disease thus induced in them. Camper and Koopmann were perhaps not so unlucky, for it is said that the former managed to save forty-one out of one hundred

and twelve which he had inoculated, and the second experimentalist, out of ninety-four, was able to keep alive forty-five animals. But in Holland it was generally believed, as has been said, that Camper's experiments in inoculation tended very much to keep the disease longer in the country, and often to transfer it to other districts which might have escaped.

Vicq-d'Azyr has steeped pledgets of tow which had imbibed the virus of the disease, in oils and aromatic fluids, and he has exposed others similarly contaminated to the action of sulphureous acid and to gaseous hydrochloric acid, as well as to liquid ammonia, and yet found that these substances did not destroy the contagious properties of the poison; for when the pledgets were brought into contact with the body of an ox or cow, they developed the disease as easily as they would have done before. The same physician has attempted, though unsuccessfully, to produce the malady by puncturing the skin in several places with a scalpel dipped in the pus from sick animals; and he came to the conclusion that the affection was not communicable by this means. Permanent cohabitation with the diseased beast appeared to favour the propagation of the epizoöty, and he observes that it was useless to attempt to ward off the disease by rubbing over the skins of the healthy cattle with oil, with a view to cover the pores against the entrance of the contagious particles; for the disease attacked them just as promptly as if they had not been so dealt with, because the poison entered the system by the lungs. He saw, in Condomois, the oxen of a pious charitable lady, who deemed it not only a pleasure but a duty to till the ground for those unfortunate people who had lost all their stock by the epizöoty, and was informed that these useful creatures had resisted the contagion, which was raging on every side of them, and against which no precautions had been taken. It was imagined that a most likely means of saving a large number of animals would be to export all the healthy from a country where the disease raged to another where infection had not existed for a long time; and with a view to put this supposition to the test a great quantity were driven from Condomois to Montreal, where they were kept for many months; but as the stables had had not been disinfected, or were imperfectly so, they were

attacked by the epizoöty towards the end of 1775. He cites, nevertheless, many examples which would go far to prove that the migration of healthy animals from a region in which the disease is prevalent into one in which it has ceased may be attended with favourable results; but he adds, that if we transport animals having the germ of the malady already in them, they will all die some days after their arrival in their new country. Experiments proved that it was impossible to communicate the disease to horses, mules, asses, dogs, cats, pigs, sheep, and goats; and also that those oxen which had recovered from its effects were no longer susceptible of infection.

While the disease was playing havoc in the southern provinces of France, it broke out, notwithstanding the severity of the winter, in Normandy, showing itself first in the village of Maisoncèle; from thence it passed to Grandcour, to Mélincant, and to many adjacent parishes. Its progress was absolutely the same as in the southern provinces. The post-mortem inspections revealed the same pathological changes; and its malignity assumed the greatest intensity in some districts; for example, at Mélincant, every beast attacked died in a very brief space. At the same time, or rather before the cattle were affected, there was a disease in dogs, cats, and pigs, and it was for a time believed that the dogs had primarily infected the cattle. The symptoms were said to be analogous. So deadly was the bovine epizoöty, and so rapid was its progress, that it was feared it could not be arrested until it had destroyed all the cattle; but wise legislative and sanitary measures soon dispelled this alarm; the infected districts were encircled by troops to prevent communication with the healthy ones; all the diseased and suspected animals were killed and buried deeply in the earth, and the stables and other places were carefully disinfected; by these means it was finally subdued.

In 1775 and 1776, the same disease, as already noted, gave rise to serious losses in the generality of Amiens, in maritime Flanders, in Soissons, Artois, Champagne, Franche-Comté, Orleans, and other places, where at first its destructiveness was terrible, and threw fear and consternation over every one. But already the benefits to be derived from Veterinary Science were

beginning to show themselves, and the energy veterinarians displayed under the tuition of Bourgelat, and the wise and vigorous measures they recommended the government to adopt, then, as on a recent occasion, had the happiest results for France.

An excellent memoir on this irruption, written by De Berg, is to be found in the Memoirs of the Royal Society of Paris for 1778. Some of the remarks to be found in it are far too valuable, in a historical point of view, to be lost sight of when tracing the several inroads of the mighty cattle-destroyer. This author certainly makes a mistake in not attending to the pathological anatomy of the malady, if he made any autopsies at all, for this guide in establishing the nature of the pest was thereby lost. But there can be no doubt as to its being the same malady described by the other writers at this period, and which was then prevalent over nearly the whole of France. He regarded it as *the* plague of cattle (*gros bétail*); as a strange or new disease; and as having come from Great Tartary. The symptoms common to the other bovine affections—such as dulness, stupor, heaviness of the eyes, the cold pendant ears, the shiverings and tremblings, the staring coat, the restlessness, the drooping head, the fever, the loss of appetite, and the suppression of milk, did not characterize the disease, as they were observed in other affections.

The particular symptoms were: profuse lacrymation, which almost obscured the vision; the lining of the eyelids of a red or black hue; the mouth hot and inflamed; the tongue covered with saliva; on the palate were discolourations, and red or dark-coloured pustules. The nostrils and the mouth discharged a yellow thick matter; a bilous diarrhœa, accompanied by a most offensive odour, manifested itself; tumours (*boutons*) appeared on the skin, or emphysema in the dorsal region; there was great weakness in the loins. When the animal became very uneasy, continually getting up and down every few seconds, death was imminent. De Berg noticed that the symptoms varied much in this malady, and many mistakes were made by men who pretended to cure the diseases of cattle, and who imagined they were treating different maladies; whereas they differed no more from each other in their nature than the *variola discreta* and the *variola confluens* of man, which are dependent on the

same cause. There are no characteristic signs of the malady, and the author was confident of this; for he had seen animals in an infected stable which only ceased to eat, or appeared to be unwell, for some twenty-four hours, and which recovered in two days, although others in the same place exhibited the malady by the most marked symptoms. All those standing in the same stable were sure to be infected within a month. If cattle of different breeds and various ages did not always manifest the same symptoms when attacked, yet each of them showed some unmistakeable token of the disease.

The remedial measures which were opposed to the malady, in considering it as an epizoöty, were entirely without effect; but the measures which were employed, when viewing the disease as more contagious than the plague of mankind, were attended with success, and especially in proportion to the activity, the care, and the vigilance of those who were entrusted with their execution.

The author believed that the poisonous germs existed in the body of the animal; that they adhered to the hair of the skin; that they lurked in the excretions and the exhalations; and that they could be carried in the air, where, however, if in time they did not find a body susceptible of receiving and nourishing them, they perished. These pestilential vapours attached themselves to spongy substances, to plaster, to cobwebs, or to wool. As a result of this, all the cattle which had not yet been infected or cured contracted the disease if they came in contact with a sick animal, or with bodies impregnated by these vapours. It sufficed that an infected beast remained but an hour, or even a few minutes, in a stable, in order to contaminate all in the place; the disease would manifest itself before a month, even were the cattle driven to a distant pasture. Every animal which had contracted the disease in this way retained its health for fifteen days. It was only after this period that it began to refuse its food, and the plague announced its presence by unequivocal signs. Such an animal might yet, while preserving the appearances of good health, communicate the malady to another, or to many which had not been affected previously. It was not always a mortal disease, and appeared to lose its dreadfully destructive properties;

but its contagious qualities were never lost at any time. All the animals which had not been cured, and which stood in the same stable, contracted the infection. De Berg witnessed a thousand examples of this truth, and never met with anything to the contrary. In general, nine-tenths of those attacked died; at other times three-fourths, or two-thirds, or one-half the animals of a village or canton perished.

It always happened that if a portion escaped by recovery, their deliverance was ascribed to the remedies administered. This pretended success was announced in the public papers and in the journals; but the deceit was soon discovered, for the inventors of these panaceæ, on being called upon to employ their medicines in another village in the neighbourhood, signally failed; and perhaps all the animals seized with the malady perished except a twentieth or thirtieth part. It was remarked, that *its disastrous effects were far greater in districts or villages which lay low, or were near marshy localities, than in those which were situated on high or dry ground.* It was rare for more than a moiety of those affected to be saved; it was much rarer for the whole of the cattle of a stable to perish, or for less than a fifth or a tenth part to escape. Two-thirds of the number sometimes recovered. All these were exempted from a second attack; if there existed examples to the contrary, which have been duly confirmed, then they were even more rare than those of the small-pox in man having been contracted a second time. An animal which had recovered could be sold for twice the amount of one which had not had the malady. It was a disease most difficult to arrest in communes; it extended with great rapidity in the cantons where cattle were at pasture when it broke out. Unless animals were kept in closely-confined and isolated stables, widely apart from each other, it was probable that in two or three months the contagion would spread from one extremity of Europe to the other. It gained, step by step, the prairies covered with cattle; it followed the direction of the great roads, and that of the winds; it attacked the cow-sheds of proprietors in districts the most distant from each other, but who were allied by ties of relationship; hence it was said that the disease jumped from one place to another, just because these family connections were not taken into

account. It made yet greater progress in the cantons where trade was not rigorously watched, and where animals were sold at any price because they had communicated with the infected. The dealers then took them to the different villages, which could not fail to be infected in their turn. Here, again, it was concluded that the malady jumped, and that it was not contracted by contagion. We ought to regard an infected stable, he asserts, as a centre which exposes all those around it to an infinity of imminent dangers from communication.

De Berg thought the disease a new one in Europe, and altogether unique; differing as it did from all other epizoöties in only disappearing from a place when thoroughly extirpated, and bidding defiance to the seasons. When recoveries took place, they were to be attributed more to nature than to the remedies employed, and the same might be said of the preservative remedies.

A curious fact is noted. The pious, but little enlightened zeal of some individuals, in 1773, caused all the cattle in the village of Tumaide, in Hainault, to be collected in the cemetery, with the exception of eleven, which stood in a cow-shed some distance apart. The number assembled amounted to two hundred and thirteen, amongst which only three or four infected beasts were recognized; though they only remained together for an hour, yet they all contracted the disease, which was manifested in the space of a month, and the eleven kept in the isolated stable alone escaped.

The principal symptoms observed did not vary in any particular from those already recorded. Bellerocq noticed that, in some, the mouth was open and gasping, and that sometimes the anus was relaxed and the rectum protruded. The directors of the Veterinary School remarked, in the first stage of the malady, a peculiar agitation and shaking of the head, which was carried close to the ground; plaintive sighs were frequent; and if some blood was drawn from the animal, it looked black, and did not yield any serosity after standing a while. About the fourth or fifth day the flanks began to beat very irregularly; the pulse became feeble and inconstant, and the strength quickly disappeared. The discharge from the nostrils was thick and fetid;

the excrements were liquid, and sometimes mixed with blood, and had an insupportable odour; subcutaneous emphysema appeared, and tremblings, shiverings, coldness of the horns, ears, &c., preceded death.

M. Faur, of Beaufort, observed that the tongue, the palate, and the whole cavity of the mouth, appeared white, from a peculiar secretion, and that these parts, as well as the nostrils, were often covered with pustules (*boutons*) and ulcers; the urine was scantier and deeper-coloured than in health.

M. Prat, of Montauban, having followed up the symptoms, day by day, in an ox which he cured, gives a most interesting and detailed description of them. This ox, aged six years, strong, vigorous, and in good condition, after having worked and fed as usual on the 13th of December, was found at four o'clock on the morning of the 14th away from its manger, carrying its head low, and trembling. This shivering lasted till four o'clock in the afternoon; then the ears, horns, and the rest of the body became hot; the pulsations of the carotid arteries were very strong, and the spine became so sensitive that the slightest touch made the animal crouch. The white of the eyes was inflamed, and the whole extent of the neck erysipelatous. It refused food and water, and seemed much distressed. The blood abstracted at eight o'clock in the evening was very thick, and did not yield any serum. Near the umbilicus a tumour appeared, about the size of a finger, which being deeply incised yielded a quantity of black, sanious, and stinking fluid. On the 15th of December, the second day of the malady, it had a long and violent exacerbation of all the symptoms, accompanied by convulsions; on the 16th the fever had abated, and it passed a quiet night; on the 17th, the fourth day, the convulsive movements had disappeared, and the dejections were very fetid; on the 18th and 19th they were the same. By the 20th the fever had disappeared; on the 22nd the ears and horns were cool, and the animal had recovered. The authors of this period had remarked that the symptoms usually enumerated were not all to be seen in the same animal. The most constant were the extreme sensibility at the beginning of the disease, the dulness, weakness, and absence of rumination; the alternations of heat and cold, similar

to those of intermittent fever; the continued acceleration of the pulse, and the diminution of milk in cows; towards the fourth or fifth day diarrhœa or dysentery, with symptoms of gangrene or putridity, manifested by the extreme fœtor of the matters escaping from the eyes, nostrils, mouth, or anus; or by general or partial emphysema, betraying gangrene of the cellular tissue. The next most constant signs were the black blood, deficient in serum; the paleness of the tongue, and sometimes its flaccidity; drooping ears; an alteration in the eyes, either in their form, colour, or inflamed condition, and their tearfulness; the twitchings of the muscles, especially when the animals were touched; the plaintive cries; the difficulty in respiring; the corrugation of the skin and its adherence to the ribs; the harshness of the hair, and a tenseness in the left lumbar region. The less constant, equivocal, and variable signs were the dryness of the mouth, the changes in its interior, especially about the tongue, where were sometimes observed pustules the size of a pin's head and exulcerations; tumours on different parts of the body; tension and hardness of the belly; the fulness and hardness of the pulse, &c.

Vicq-d'Azyr, seeing the difficulty of diagnosing the disease, proposed inoculation as a means of discovering its existence, which could be ascertained in six or eight days afterwards. But in producing the malady in another animal, says Paulet, the diagnosis is no clearer; we may certainly assure ourselves that it is contagious and communicative, like a hundred others; but we should not forget that eight days and a healthy animal are lost. M. Doazan thought that the earliest symptom was staggering, and as soon as this was noticed he recommended prompt separation. He thought the milk of infected cows altered almost before anything else was noticed. It was less white than usual, and a little more salt and slightly bitter; when put on the fire it did not froth up like healthy milk, but became decomposed and grumous. M. Guyot, of the Veterinary College, remarked that before the disease declared itself, when he passed his hand into the rectum, it felt very hot, and the arteries beat stronger than usual. There was no eruption on the skins or tumours seen.

Paulet remarks: 'If we compare all these symptoms with

those which manifested themselves in the epizoöties of 1711 and 1745, and especially with the non-eruptive variety of the last, observed in Holland, Vivarais, and Bourgogne, we cannot doubt but it is the same malady which has been renewed many times since then, and of which the symptoms, essential or pathognomonic, either from the circumstance of climate, pasturage, or season, have been somewhat changed, but yet not marked enough to constitute a new kind of disease. In fact, if we consider its duration of seven, eight, or nine days, the continuity and nature of the fever, the depression of the vital powers, the diarrhœa or the dysentery which constantly appears towards the termination of the disease, the emphysematous tumours, the signs of putridity or gangrene, the variations in the fever, the results of the autopsies, the character of the prognosis, and the difficulty of treating it successfully;—all proves that it is the same malady which is always appearing either from the same sources as the preceding invasion, or is renewed or reproduced without ceasing in some part of Europe where its germs have not been completely stamped out. Otherwise, it appears to be limited in its attacks to a single species of animal. But the most striking resemblance is that which exists between the means unsuccessfully employed at every period, and which we have recourse to now. In 1711 and 1712, bleedings, all the alexipharmics, cordials, febrifuges, sudorifics, and the mercurial and antimonial preparations, were used without benefit; in 1745, '46, and '48, nearly every known method was brought into operation, but in vain. The physicians have frankly avowed that all the cures were due more to nature than to art, and the greatest doctors make the same confession now-a-days. We have seen the most celebrated physicians condemn, one after another, nearly all the internal remedies employed. ..... In 1712, Lancisi and Gazola, a physician at Verona, seeing the inutility of remedies, advised the slaughter of all the diseased beasts; this counsel was followed in England in 1714; in 1771, all the diseased were killed in Austrian Flanders; in 1773, M. Dufot gave the same advice; in 1774, the Veterinary College of Paris, M. Bourgelat, Vicq-d'Azyr, and others only repeated it, and an order to that effect is given and executed in 1775.' Speaking of inoculation, he says, 'Vicq-d'Azyr made

some experiments in 1775 on animals of the same and of a different species; the symptoms and the danger were the same in oxen; *three sheep died after inoculation without taking the disease, in consequence of the gangrene which ensued where the wounds had been made.* The only difference between the results of all these experiments is that the Marquis de Courtivron tries to disabuse the public mind of an opinion which has already cost the world so much—the belief that when an animal has once had the disease it is safe afterwards; whereas Vicq-d'Azyr endeavours to assure them of its truth. What is, then, the conclusion to be derived after so many experiments and researches conducted with so much labour and cost? Have we no resources against such a pestilence? It is only too true that we have few; but we have acquired a precious truth notwithstanding, and that is the inutility of employing any of these means. . . . . The actual malady is a species of pest, which has not perhaps its exact analogue in the human species (dont il n'y a peut-être pas d'exemple semblable, à la rigueur dans l'espèce humaine). *It is an acute, pestilential, putrid, and gangrenous fever,* or, if we like it better, an *ardent malignant fever,* fomented by a deleterious and contagious principle, of an *erysipelatous* nature, capable of producing an inflammation or gangrenous phlogosis in cattle, and infecting their humours, and whose chief seat is the upper air and digestive passages, the brain and the spinal cord, and generally the whole nervous system, particularly at its origin; and which is proved by the extreme sensibility, especially about the spine, the loss of power, and the state of the viscera. If it were permitted to draw an analogy, we might compare the accidents that the animal experiences to the effects of certain poisons, which, while they act directly on the tracks they are in contact with and cause a gangrenous inflammation, carry their action at the same time to the nerves, causing stupor, tremblings, convulsive movements, apoplexy, &c.; while others infect the blood, lymph, and the nervous fluid without sensibly injuring the digestive canal.'

It is supposed, as already noted, that this last attack of Cattle Plague cost France 150,000 animals, valued at about 150,000,000 francs.

During this unhappy period for the French agricultural community, amongst all the precautions and instructions published, nothing was more spoken of or appreciated than the circular of De Brienne, Archbishop of Toulouse, which was addressed to the clergy of his diocese. This enlightened and worthy man clearly perceived the great necessity for keeping the cowhouses in proper order, and that preventing all communication between the healthy and diseased animals was the first duty to be attended to;—a duty which did not interfere with prayers, and even became an act of piety, agreeable, as he thought, to the Creator; he insisted chiefly on this measure, and on the danger of pilgrimages and assemblies. These were most important points to enlighten the peasantry on.

'Alitur vitium, vivitque tegendo
Dum medicas adhibere manus ad vulnera pastor
Abnegat et meliora Deos sedet omina poscens.'

This truth is applicable to all time, to all countries, and to all religions.

It is somewhat remarkable, that, during so many invasions of 'Cattle Plague' over nearly the whole of Europe during this century, Spain should have escaped a visitation of the dire scourge. This exemption may be readily accounted for, however, if we remember that Spain has never been a cattle-importing country, and that her commercial transactions in this respect have been confined to exportations. Its distance from the usual sources of animal contagions, the very efficient police that has been maintained to prevent their introduction, its geographical position, and its natural salubrity, appear to have insured that kingdom against the destructive plagues which harass other countries. But the appearance of the pest in the south-west of France was a grave danger for Spain.

Within a month after the contagion had been carried by the raw hides to Bayonne, which lies near the Pyrenees, and not far from the jealously-guarded border land, it by some means got carried across the Spanish frontier to St Sebastian, and from thence spread rapidly over a wide surface, causing sad losses.

For the history of this remarkable invasion of Spain, we will refer to the account given by Villalba.[1]

'On the 11th of July, 1774, the Marquis de Bassecourt, General-commandant of Guipuzcoa (a province of Spain), reported to the supreme Board of Health, that in the province of Labourd, in the Kingdom of France, a region adjoining that which was under his command, there was spreading a grievous sickness of a contagious character, and which was every day sweeping off large numbers of cattle; so that there was every reason why the introduction of these French beasts should be absolutely prohibited, and that even the importation of sheep should be forbidden by new and stringent measures. In consequence of this notice, the supreme court, looking wisely at the aspect of affairs, and being desirous of defining precisely whatever was necessary for the preservation and welfare of the people, urged upon the mayors the adoption of the most important measures; and there were despatched, by virtue of their orders, Ignacio de Michelena, Juan de Ordoi, and Martin de Lorz, chief veterinary surgeons, to the vicinity of San Sebastian, to investigate and report upon the malady. These men having done so, certified before a commission that the disease consisted in a dissolution or ramollisment of the brain, and they founded this opinion on the happy results which had attended the inunction of strong ointments on the top of the neck, and also because able anatomists had observed that after death there was observed in the brain a greenish or bloody fluid, as if there had been suppuration or gangrene; and also that the medullary substance of the horns, which was much wasted, contained a yellowish matter. The use of aquafortis, and other remedies which they prescribed, produced tolerable results sometimes; but in other instances they were entirely useless; so that to prevent the disease spreading, or its introduction into other places, these authorities most energetically endeavoured to persuade the authorities that the only certain, just, and equitable remedy for extirpating the contagion was to kill the animals, and to inter them deeply in pits. . . . . In such a way, that if in

[1] *Villalba.* Epidem. Española, vol. ii. p. 229.

every place this salutary measure had been put in practice, the epizoöty which was introduced into Spain in 1774 would soon have been suppressed, and there would have been avoided the great mortality and suffering that occurred, inasmuch as in many towns and villages there perished every head of cattle without a single one remaining,—as happened, for instance, in Andoin in the province of Alva; neither did the contagion work much less ruin in its progress through Navarre, Guipuzcoa, Arragon, the mountains of Santander and those of Pas. Notwithstanding the precautions taken to destroy everything obnoxious, as had been recommended by Dr Ortiz during the epidemy at Pampeluna (a city of Spain), so great had been the ravages of this epizoöty in the kingdom of Granada, that but few cattle remained; and despite the enforcement of the measures of burying the dead animals in deep pits, it was impossible to prevent the stinking particles from rising into the air, though large quantities of lime had been used over the burial-places, and with much care. Escovar has made mention of this vaccine epizoöty and its origin; according to him, it was notorious that the contagion could be communicated from one to other animals, and be again produced in them; from these it could be carried to other pastures, and for a long time it had inflicted suffering on many kingdoms, without any ground for suspicion having been laid as to the contagious particles being disseminated by the air since 1708; from which cause it has become so universal in Europe, and has so frequently and persistently induced such mortality amongst animals.'

An epizoöty, supposed to be Cattle Plague, appeared at Laxfield, in Suffolk. It would appear that it was confined to this parish, if not to one herd of cattle. Its suppression was supposed to be due to the enforcement of the measures contained in the Orders of Council, which were similar to those already noticed as in existence in this country. Malignant pneumonia prevailed in the provinces of Brescia and Crema, Italy, during this and the preceding year.[1]

A.D. 1775. The winter was very cold, and the summer

[1] *Bottani.* Op. cit., vol. vii. p. 78.

much warmer than usual. In September an earthquake shook Wales and its neighbourhood. In October there were great thunderstorms in England. From March until January, 1766, epidemic influenza travelled across Europe. Animals were affected before, during, or after man, and with analogous symptoms. In Britain this was especially noted. Dr Fothergill says: 'During this time horses and dogs were much affected, those especially that were well kept. The horses had severe coughs, were hot, forbore eating, and were long in recovering. Not many of them died that I heard of, but several dogs.'[1] Immediately before it set in, Dr Cumming writes: 'After the middle of August, I. have heard from good authority, that a disease amongst horses prevailed very generally in Yorkshire..... About the latter end of October, I remember to have heard that one gentleman had lost six dogs, in the usual manner that these animals are seized—a giddiness in the head, an inability to eat, with a paralytic affection of the hinder extremities.'[2]

Drs Glass and Pultney make similar observations; the former asserts that in September many horses and dogs suffered, and the latter that these were affected before mankind.[3]

In France, Lorry writes in a like manner: 'The year 1775 had begun with misfortunes for the poor. The scarcity of grain had afflicted a large part of France; and even in the capital the use of rye-bread, until then unknown to the artizans, became an article of daily consumption amongst the poorer classes. Dogs and fowls had experienced an epizoötic malady of a different kind: that of the dogs was evidently an inflammation of the pituitary membrane and a catarrhal angina; that of the fowls had some analogy with the gout; they both appeared to be contagious.'[4] In 1776, according to Huzard, epizoötic catarrh in horses succeeded the epidemic influenza of man in the spring.[5]

A remarkable mortality among the finny tribes appears to

[1] *Dr Fothergill.* Med. Observations and Inquiries, by a Society of Physicians in London, 1764.

[2] *Dr W. Cumming.* Letter to Dr Fothergill, 1775.

[3] Annals of Influenza. Sydenham Soc., p. 112.

[4] *Lorry.* Mém. de la Société Royale de Médicine, vol. i. p. 1.

[5] *Huzard.* Journal de Médecine, vol. liv. p. 333.

have been observed during the month of November at Sumatra; the sea was covered with their dead bodies.[1] In France, an epizoötic ophthalmia amongst fowls was observed and commented upon by Huzard. 'I have observed, at the termination of the springtime of 1775, that the fowls, and more particularly those which had been hatched the preceding year, have had inflammations (*fluxions*) of the eyes, which have destroyed all attacked. The humour of this inflammation, which was of an albuminous nature, was exuded in successive layers over the cornea, forming a kind of secondary globe of a white or yellowish colour, and projecting very much outwards, so that the real eye was entirely hidden and buried in the bottom of the orbital cavity, where it diminished in volume in proportion as the external growth increased in size. This disease never affected more than one eye; when it reached its last stage, and death was approaching, on pressing the outer circumference of the orbit, this mass of foreign matter became detached. It was of a very firm consistence, resisting even the cut of a scalpel, and there flowed from the eye a fetid sanious matter. The cavity of the orbit was black and gangrenous-looking, and the crest of the bird was shrunken and dry. The fowls leaned their heads to the side which was not diseased, and gave vent to a dull cry, like a rattling or gurgling sound, which only ceased with life, on the fifteenth or sixteenth day.'[2]

Small-pox in man, according to Professor Darluc, was very prevalent at Aix and its vicinity; and at the same time, and in the same places, small-pox was making great ravages amongst sheep.[3] In Istria and Dalmatia, epizoöties of malignant peripneumonia were frequent from 1774 to 1776.[4] In France, the Cattle Plague yet continued its devastations, and is described by Grignon.[5] At Minden, in Westphalia, it also raged; and its eruption here was supposed to have arisen from the pastures being tainted, in consequence of animals which had died from this malady some

[1] Philosophical Transactions, vol. lxxi.

[2] *Huzard.* Instructions et Observations, vol. iv. p. 315.

[3] Hist. de la Société Roy. de Médecine, vol. i. p. 250.

[4] *Bottani.* Op. cit., vol. xi. p. 229, 273, 379.

[5] *Grignon.* Observations sur les Epizoöties Contagieuses. London et Paris, 1776.

years before having been buried in the fields and meadows. In France, anthrax destroyed many horses and cattle in Beauce.[1] In Finland the same disease appeared, and was attributed to the evil workings of the infernal furies. 'The summer of the last year (1774) was unusually warm and dry, and caused in Finland, towards July, a severe plague in cattle, which destroyed many. The disease was very different from that which in a former year raged in Schonen, for it did not affect the animals over a large district, but remained in certain parishes and villages. On the other hand, it had this special and sad characteristic: it attacked many people who incautiously went among the sick and dead beasts, and some of these perished. Many of the cattle died quickly and unexpectedly; in others, however, the disease was not so virulent. The following symptoms were noticed: hanging ears and head; watery and red eyes; hot and dry mouth; nostrils expanded; laboured and snuffling breathing; head and horns hot; the tongue rough and hard; the palate white; suspension of the secretion of milk, and absence of rumination; many had diarrhœa, others had it not. On the neck, and also on the flanks and under the belly, hard tumours arose; these were moveable, and often swelled and burst, discharging a sharp, acrid matter; after being emptied they commenced to form again. The disease was of so putrid a character that the animals fell to pieces after death; indeed, in such a way, that if cords were tied round their horns to drag them away, these appendages broke off. Towards the end of September the malady gradually disappeared. After it had killed many horses and cattle, it began to show itself in mankind. Those who had been engaged about the sick or dead animals were attacked at first with a pustule on the face, hands, arms, or legs; which pustule itched a little, became inflamed, swelled, and increased so much that, if report be true, the head looked like a two-gallon measure. The tumour became covered with bladders or vesicles; these burst, and gave exit to a red and yellowish fluid, which at last became black and encrusted. They who had the tumour opened and dressed with tar or oil of tobacco, recovered. It was not noticed that people

[1] *Barrier; Chabert.* Instructions et Observations sur les Maladies des Animaux Domestiques. Paris, 1813. Vol. i. p. 208.

infected one another.[1] In Sweden this disease was known as the 'skott-sjukan,' and was believed to be caused by a small worm. It will be alluded to at another time.

In this year, from some unknown cause, a large bed of oysters in the harbour of Wellfleet, Cape Cod, which had previously furnished large supplies, sickened and perished; they have never grown since. At the same time, the oysters on the shores of Connecticut were in an unhealthy state, and sometimes excited vomiting in those who ate them. In 1776 the lobsters in the vicinity of York Island all disappeared.[2] Other authorities give the previous year for these events.

According to Lafosse,[3] glanders in horses assumed an epizoötic character, and became widely spread over the southern parts of France. This author, in observing that it succeeded the Cattle Plague, asserts that it doubtless originated, to some extent, through the excessive labour imposed upon the horse species, consequent on the working oxen having been destroyed by the plague; and also probably to some diseased horses having been introduced among the large numbers purchased in other countries, to repopulate those provinces from which the bovine race had nearly disappeared.

A.D. 1776. An earthquake at Audries, in Italy, in July. The Hessian fly (*tipula tritici*) appeared for the first time in North America. The canine species are mentioned as suffering much. An observer in Africa, in the neighbourhood of Bonny, describes a malady among foxes and wolves. 'We have observed during two years (1776 and 1780), that even the animals which live in the forests were attacked with a particular epidemic malady. The roads were, if we may so speak, strewed with wolves and foxes, dead and dying. Their disease appeared to draw them to the high-roads, and the stricken creatures seemed no longer to dread the presence of man. We even heard it said that these creatures threw themselves in the way, as if asking for assistance and remedies against their maladies. This

[1] *Odhelius.* Von der Viehseuche, &c. Schwed. Abhandlung, vol. xxxvii.
[2] *Webster.* Op. cit., vol. i. p. 429.
[3] Traité de Pathologie Vétérinaire, vol. iii. p. 968.

disease, which was the same as that observed among dogs, consisted in a weakness and trembling in their extremities; they staggered in walking, and showed the greatest aversion for food; they vomited glairy matters, and even bilious-looking fluids; they had fever and diarrhœa, sometimes stercoraceous, at other times lienteric, at others bilious, and even dysenterical; they nearly all died. This disease appears to have a great resemblance to intermittent fever.'[1] The French West Indies were visited with epizoötic rabies from 1776 to 1778. 'It was believed for a long time that the Antilles were exempted from rabies, because until now no mad animals had been seen; but from 1776 to 1778, it has reigned almost continuously. At Guadaloupe, the dogs were at first attacked with dumb madness, such as we had observed many years before, but without any other consequences. To this dumb madness succeeded that of a furious character: many cattle have been bitten and have died of rabies; we have also seen many people perish from this malady, negroes as well as white people. Numbers of dogs which have been bitten died only with symptoms of dumb madness (*rage muet*); but others have become really mad, and bit whoever and whatever came in their way.'[2]

In the autumn, an epizoöty destroyed many deer in the forests of St Germain, in France. It did not affect the bucks or the roebucks. Its cause was supposed to be due to the great drought during the months of August, September, and October, and to the animals being obliged to drink corrupted stagnant water.[3] Anthrax was prevalent during the summer in Lower Austria, and at Wilna, in Poland, and was frequently communicated from animals to mankind.[4] In Holland,[5] in many provinces of France, and in Corsica, the Cattle Plague continued its ravages. In Austria 'ekzema epizoötica' was very common. 'In the same manner as the anthrax (*milzseuche*)

[1] *Ramel.* De l'Influence des Marais, &c., p. 221.

[2] Des Moyens de Conserver la Santé des Blancs et des Négres, &c. St Domingo, 1786.

[3] Histoire de la Société Royale de Médecine, vol. ii. p. 150.

[4] *Adami.* Vieseuchen in den K. K. Erbländern, pp. 70, 82.

[5] *Geert Rinders.* Waarneminger en Proeven, &c., 1776.

had attacked the woody and mountainous districts, so did the mouth disease (*maulweh*) show itself almost generally in low and flat districts, and it lasted from the spring until the autumn of 1776. In some neighbourhoods oxen alone were affected; but in others, however, oxen and cows suffered, the latter with less severity. In many localities and sheds it attacked nearly the whole of the stock in one day, but in most cases the animals were attacked one after another. Here and there this disease accompanied the anthrax; and in some woody neighbourhoods the oxen were attacked with the latter disease after they had recovered from the former.'[1]

In 1776, glanders continued to rage in an epizoötic form in France.[2]

A.D. 1777. An earthquake in England. Scarlet fever was epidemic in many countries, and in England and France was complicated with malignant sore-throat or diphtheria. In the month of May in the preceding year, glossanthrax had appeared among cattle at Fossano, near Turin; and in March of this year 'angina gangrenosa' developed itself among the horses of a regiment of dragoons at Dora, near Turin. Brugnone describes it: 'This malady began in a single horse on the 29th of March, and this animal died in the space of thirty hours; the following day it attacked two more, and these died—the one in eighteen and the other in thirty-four hours; on the 31st ten more sickened, four of which were cured, two in four days, one in five, and the other in eight days; all the others died, one in nine hours, one in twelve, one in thirteen, and one in twenty-one hours, another died in three days, and the sixth horse in four days. On the first of April other three became unwell, one of which was cured in five days, and the other two died,—one in nine hours, and the second in three days; on the 2nd of April only one was attacked, which died in two days; on the 3rd three sickened, of which two died in two days and one in three; on the 4th two others became ill, and one recovered in three days; the other, after being sick for four days, was killed when apparently recovered; lastly,

[1] *Adami.* Viehseuchen in den K. K. Erbländern, p. 105.
[2] *Kirchner.* Magazin für Thierheilkunde, 1865.

on the 5th, three horses were seized with the same symptoms, and these died—two in two days and one in three days. So that out of thirty-six horses, twenty-five were diseased and eighteen perished, while eleven remained unaffected.' The symptoms were, 'a slight beating of the flanks, a loss of appetite, a want of vivacity in the eyes and the whole physiognomy, an uncommon slowness and unwillingness to move; there was but little sensibility when struck, and no heed taken of the voice; the head was carried low and drooping; the skin over the whole body rough and dry; the ears and the extremities, as well as the entire surface of the trunk, alternately hot and cold; there was a great inclination to lie down; a dry, but not excessive, heat in the mouth and about the tongue, which disappeared at times, and gave place to another temperature with a pricking sensation (*formicolamento*); a great quantity of viscous saliva flowed from the fauces; the pulse was small and slow, and easily compressed in the majority of cases in the early stages of the malady. In a few hours all these indications became increased; the beating of the flanks was very strong; and if the back of the hand was placed against the ribs, there was immediately perceived a tumultuous and extraordinary action of the heart. In all those which died suddenly there was no fever, no beating of the flanks, and no palpitations. There flowed from the nostrils a matter which was at first white, then afterwards of a viscous consistence and yellowish tint, which adhered to the nostrils, and formed clots or scabs around them and the lower part of the face; the whole extent of the pituitary membrane as far as could be seen, instead of being of a uniform rose-colour, was either very pale or livid; the horse moved but little, and that very unsteadily, and continued lying down sometimes on one side and sometimes the other, getting up and down every moment; suddenly breaking out into a tremor, either in one fore-arm, or both, or over the whole body. From beginning to end there was obstinate constipation; the small quantity of fæces that was passed by the intestines was hard, shining, and fetid; when it happened that there was an inextinguishable thirst, the fæces were as in health, solid, of their proper form, neither too hard nor too soft, always of a yellow colour and shining,

sometimes accompanied by a multitude of small worms (*lumbrici*); the urine was abundant, turbid, yellow, and stinking. . . . . Not only was the difficulty in swallowing very slight, but, as has been said, the obstruction to the respiration did not produce much injury; compression of the upper part of the windpipe by the hand did not make the animal evince any pain, neither did it make it cough; in a word, if the opening of the dead bodies had not shown the seat of the disease, there would not have been the slightest suspicion of strangles, or that which has been named by veterinary surgeons esquinancy (*angina*). A post-mortem examination then showed that the fauces,—that is to say, the tonsils, and from thence to the soft palate, and all around the pillars and the chief parts of the pharynx, to the openings of the eustachian tubes—were of a black colour similar to soot, and truly sphacelous; where this sphacelated appearance terminated there began a soaked condition of the membranes, which were filled with a yellow gelatinous substance, occupying the soft palate and the cellular tissue of the circumjacent parts, and extending a long way on the exterior of the trachea and the œsophagus. The pituitary membrane lining the air-passages of the nostrils was black and gangrenous; minor lesions were commonly met with in the larynx, but not in its ventricles; within the canal of the trachea there was at times a small quantity of viscid mucus in a frothy state, which also was noticed in the lungs and the bronchiæ.'[1]

A curious epizoöty was noticed in Germany; cows and breeding sows aborted in large numbers.[2]

In Hanover there was an epizoöty among geese. Diarrhœa was the most prevalent symptom during life. The appearances after death were as follows: 'The stomach and intestines were much inflamed, and the gall-bladder was full of a dark-green and stinking bile. In the intestines were found many polypi formed by the aggregation of small coagula of lymph, some of them half an ell long, the thickness of a finger, and of a brownish-red colour. In the rectum was a quantity of white excrement which had a most offensive odour.'[3]

[1] *G. Brugnone.* Storia della Squinanzia Cancrenosa, &c. Turin, 1777.
[2] *Chabert.* Instructions, &c.
[3] *Rüling.* Med. Beschreibung der Stadt Northeim.

A.D. 1778. An earthquake at Smyrna in July. Scarlet fever and epidemic angina in mankind were very prevalent in many countries, but particularly in England and Holland. From July to September, an epizoöty of anthrax showed itself in Thuringia and many other parts of Germany. Cattle, horses, asses, goats, pigs, and deer of all kinds were affected; many hundreds of the latter died.[1] After this epizoöty had ceased in September, an epizoöty of 'ekzema' appeared.[2] In Austria the two diseases reigned at the same time.[3] In Limoges, France, anthrax was epizoötic;[4] and in Picardy, that peculiar form of skin disease in sheep called *noir-museau* was very common.[5]

According to Kausch, bovine contagious pleuro-pneumonia prevailed as a veritable plague in Upper Silesia from this year until 1790.[6] It prevailed at the same time in the kingdom of Wurtemberg; the commonalty of Tuttlingen, in 1777, had lost about 150 cattle from the malady.[7]

A.D. 1779. In the district of Belluno, in Italy, it was reported that a number of people and domesticated animals had been bitten by a mad wolf in the month of March, and that many of these died of hydrophobia.[8] At Bourges, in France, in the same month, a mad wolf bit a child, and this manifested symptoms of rabies.[9]

At Philadelphia and Maryland, in America, rabies canina was very common.[10]

In Istria, bovine epizoötic pleuro-pneumonia prevailed from this year until 1780.[11]

In Switzerland, glossanthrax was observed.[12]

In the marshy districts of Picardy, in France, an 'epizoötie typhoide,' as it has been termed, appeared among cattle. It was described by Vicq-d'Azyr, and at that time seems to have been

[1] *Glaser.* Von der Knotenkrankheit. pp. 3, 7, 32. [2] Ibid. p. 132.
[3] *Adami.* Beiträge zur Geschichte der Viehseuchen. Vienna, 1781.
[4] Gazette d'Agriculture, 1778.
[5] Hist. de la Soc. Roy. de Med., vol. i. p. 251.
[6] *Kausch.* Originalbemerkungen über die Rindviehsterben. Leipsic, 1790.
[7] *Wirth.* Op. cit., p. 299.
[8] *Odoardi; Bottani.* Op. cit., vol. xi. p. 328.
[9] Journal de Médecine, vol. liv. p. 398.
[10] *Richter.* Chirurg. bibl., vol. xiv. p. 278.
[11] *Orus; Bottani.* Op. cit., vol. liv. p. 380. [12] *Schnurrer.* Op. cit.

looked upon as a typhoid fever, accompanied by inflammation and gangrene of the abdominal viscera, and of the lungs. By many, however, it was regarded as identical with the Cattle Plague, which yet lingered in France, and which also prevailed in many provinces of Austria during this and the following year.

As Vicq-d'Azyr's celebrated Memoir on this outbreak has always been considered a model report, and as it is now exceedingly scarce, a translation of it may not be uninteresting to the student. It is particularly worthy of notice how closely the symptoms correspond with those of Cattle Plague, and it might have been that careful investigation would have revealed a contagious origin for it, and have established the identity of the two maladies.

'The epizoötic disease which is the subject of this Memoir, although very deadly and contagious, has been arrested in its progress, without having recourse to the extreme measure that necessity sometimes renders indispensable, and that the nature of the malady demands in certain cases.[1] The treatment which has been adopted at my suggestion has, in the majority of instances, been followed by success; these two circumstances, then, are sufficient to make the description of this epizoöty interesting. I shall show, in different articles, all that which concerns it: the topography or situation of the localities in which it has reigned; its local causes; its origin and increase; its symptoms; its accidental features; the internal lesions which have been observed in animals that have died from it; its connection with other analogous disorders; the curative measures and those of a preservative kind; the manner of disinfecting; the disposition of the military cordons and other auxiliaries; and the general tableau of the numbers of animals which have died and those which have been cured:—all these will be shown in succession. Besides the advantage which will result from this method, there will be manifested, in these details, to those medical men who may undertake similar labours, a just and precise idea of the objects they will have to keep in view.

'That portion of the generality of Picardy in which this epi-

[1] The Slaughter of the Cattle.

zoöty has reigned, is situated beyond Abbeville, and near Montreuil-sur-Mer; it consists of a very humid valley which is watered by the Autie. Although horses are chiefly employed there for labour, yet large numbers of cattle are reared; cows are very numerous, and form the principal wealth of the farmer, whose subsistence is principally their milk prepared in different ways. The river which flows in this valley is retarded in its course by a mill called Tigni, situated but a short distance from the sea, whose waters cause a reflux that extends much beyond the mill. The position of this building is such, that if it was built in the usual manner, the water-wheel would not be turned more than twelve hours at most out of the twenty-four, in consequence of the tides. The greatest efforts have been made to render this mill independent of the marshes, and this has been effected by raising the flood-gates and embankments of the Autie very considerably, and in such a way that the water has more than ten feet of a fall, and the mill-wheel never ceases revolving. As a result of this arrangement, the course of the river is retarded, and it often overflows its banks, flooding all the low ground in its vicinity. In that part of the course of the Autie which is on this side of the Tigni mill, the water is on a level with the banks; but on the other side, on the contrary, it is rapid and many feet below its boundaries. The pastures, too often submerged by the overflowing of the river, produces herbage of a bulky and rank nature, such as is found in marshes; while on the ground situated between the Autie and the sea grows herbage of a good quality. This inundating and the vapours to which it gives rise, acts alike on men and animals. The human species is very liable to intermittent fevers, and other creatures to be attacked by inflammatory or anthracoid fevers, and sometimes other very serious epizoöties at certain seasons of the year. The heat was very intense in the months of June and July, 1779; the damp soil was nearly dried up; the putrefying plants and insects exhaled a foul odour, and those people and cattle inhabiting the vicinity of this morass were generally affected. The first cow was attacked on the 12th of July, in the marsh of Roussan. In a short time, another died in the parish of Maintenai, after being ill for seventeen days. It is necessary to observe that the cattle of Maintenai had been

mixed up in the same pasture with those of Roussan. The 20th of July saw eight cows affected at Roussan. The parishes of Montigni and Préaux soon experienced the attacks of this contagious disease. Nampont-Saint-Firmin was afterwards attacked, and the disease extended to Nampont-Saint-Martin on the 6th of August; at the end of this month Noyelles has been infected, owing to a certain person pasturing his cows in the communal meadows of Nampont-Saint-Firmin. Vron and Avennes were the last villages into which the epizoöty was allowed to penetrate. It is most noticeable that the progress of the disease has been in direct relation to the communications, and to the imprudences without number which took place; the marsh of Roussan, which is the most unhealthy, was the birthplace of the epizoöty, and the contagion, which had arisen in a low and damp situation, was propagated by communication, and in this way penetrated to the parishes of Vron and Avennes, which are more elevated, more salubrious, and in a position which renders them less subject to diseases of every kind.

'The cattle in general coughed a long time before being ill; the cough has continued in some, but in others it has been but rarely heard. The first symptom was a grinding of the teeth with a considerable noise; soon the milk became lessened in quantity, or at other times was suddenly suppressed, the udder becoming flaccid and less pendant; the belly appeared drawn up; the hair of the back became rough and erect; the eye began to inflame; in pinching the animal about the throat it winced, and when pressure was made on the xiphoid cartilage of the sternum the back was raised like that of a camel,—a symptom, however, on which much reliance cannot be placed, because it is often observed in healthy animals; the ears and the horns were sometimes hot, sometimes cold; the pulse was at this time full, a little hard, and rather slow than quickened. The animal did not appear any more dull than usual; and often, even after the suppression of the milk, the appetite was greater than before; in a short time afterwards the rumination became unfrequent, and at last ceased altogether. These incidents belonged to the first stage.

'In the second, the milk had disappeared, and the cattle re-

fused all solid aliment; many, however, yet drank. There was a very remarkable dulness present; the head drooped; the eyes looked dry and inflamed, but soon began to be watery and purulent; this was very much so in some cases. A slight discharge from the nostrils began to be perceived; the pulse was smaller and more quickened; in many diarrhœa appeared, even from the period of the cessation of milk. Other cattle were constipated, and voided very hard excrement; we have seen four which never had an evacuation during the whole time of their illness, and have not even ejected the enemas given them, although some of these were emollient and others purgative. This obstinate constipation was followed by death. In the second stage many continued to cough; the muzzle was cold, and there flowed from the mouth spumy white saliva. In those animals which gave hopes of a cure being effected, the number of the pulse was sustained and preserved its strength; setons caused a considerable swelling, the nose did not become too cold, and there was less dulness. But in those cattle in which the disease, so far from being diminished, became aggravated, all the symptoms acquired a higher degree of intensity. The pulse became small and hardly perceptible; setons produced no effect; the animals yawned much; some remained lying without being able to get up; others did not lie down at all, and appeared very anxious. The eyes were dim and covered with a glutinous matter; the nose was usually cold; the horns and the ears were in the same state, and the head was carried low; many, however, carried it constantly round to the side, especially in the last stage of the malady. The respiration was then very laborious; the majority kept their mouths open as if gasping; in some the tongue was protruded at each expiration: the diarrhœa was then most fetid, and consisted of a thin, purulent, and even sanious matter, consisting of débris and mucosities, vulgarly called *raclures de boyaux* (gut-scrapings). In all those which had diarrhœa, this was the nature of the fæces. At last the affected animals died quietly, their heads resting on their sides.

'Many variations were observed in this disease; its usual course was run in from five to eight days; beyond that period there were hopes of a recovery. Death has been known to take

place in one or two days, and even in from ten to twelve hours; some have had the neck covered with small tumours (*boutons*), and this usually indicated a fortunate termination to the disease. Beasts that were fat perished most promptly; cows which were in low condition, or lean, seldom died; but these were in small proportion. According to the reports of the oldest agriculturists in the country, thirty-five years before this period there reigned in the same locality a similar disease, which carried off nearly all the cattle; this epoch corresponds to the years 1744 and 1745, which were deadly to the horned stock over nearly the whole kingdom.

'The dissection of the dead gave the following results:—1. The abdomen was usually distended like a balloon. The extremity of the rectum was everted, forming a kind of violet, mushroom-like tumour containing purulent and putrified fluid; the epidermis was easily removed in those animals which had been dead for twelve or fifteen hours. The eyes were covered with mucosities; the nose was excoriated, and the mouth, as well as the tongue, was covered with a foul matter; the body, indeed, was very fetid in all its parts. 2. The brain did not present anything remarkable, except in some animals which had been examined, when its ventricles were found filled with an abundance of lymph. The posterior parts of the mouth were very little inflamed, but this region was filled, more or less, with the same kind of fluid that was discovered in the bronchial tubes. The commissures of the nostrils were in a healthy state; the parotid, maxillary, and sublingual glands were a little inflamed, and looked as if they had been macerated in serum. 3. The only observation made in the region of the neck, showed that the vesicatory setons passed through the dewlap, did not, as a rule, operate well in those animals which died; the cellular tissue in their neighbourhood was in a relaxed and infiltrated condition, and this extended to the anterior aspect of the thorax. 4. The axillary glands appeared to us infiltrated like the parotids. 5. The trachea always contained a large quantity of foamy mucosities, in which concretions similar to broken-up membrane were mixed. The lining membrane appeared to be inflamed in many instances. 6. The lungs were distended as if with air; the large lobes were usually but little affected, but the small anterior lobes were

gorged with blood, of a livid colour, and often sphacelous. On being cut into, a puriform matter, similar to that which filled the trachea and flowed from the mouth, exuded. The bronchial glands, like the axillary, the inguinal, and the mesenteric, were infiltrated. 7. The pleuræ participated, in many cases, in the inflammatory state. 8. The epiploon (*omentum*) showed oftentimes patches of inflammation and gangrene. 9. The rumen was very much distended by an enormous mass of food, which we have frequently found hot and as if fermenting. In nearly all the subjects, the lining membrane of this viscus was detached, and covered the alimentary matters in the form of a brown pellicle, which was without consistence and easily torn.[1] The reticulum was often in the same state; the lining membrane which covers its meshes was sphacelous, and could be removed at the slightest touch. The third compartment (*feuillet*) was gorged with dry food; in some cases this was excessively hard, and in many parts of the viscus we perceived, on examining it closely, that the dryness was very considerable. The internal membrane was separated and remained attached to the food, where it appeared brown, like bronze. The leaves of this division were also very soft and easily torn; but the hardness of this organ was not always the same. The fourth compartment (*caillette*) was always very inflamed; many of its plicatures were livid; that portion which was nearest the pylorus was the most affected, and was not unfrequently swollen and looking as if ulcerated. This cavity was filled with a very fetid greenish fluid. 10. The inflammation reached its highest degree in the small intestines; the blood-vessels were gorged with blood, and the intestines themselves were filled with a putrid matter and mucus concretions which covered their walls, while the lining membrane itself was in a very unhealthy state. The inflammation was less severe in the large intestines, where the mucosities, however, were in greater abundance. We have once found the rectum excoriated in many places, and covered with a glutinous white substance like pus. 11. The gall-bladder was very distended; on opening it bile of a dark-green or yellow colour escaped, which in some cases had the consistency of olive oil; there always remained in this viscus a considerable sedi-

[1] This is a normal condition.

ment. 12. The liver was softer than usual, and was easily torn. The whole of the muscles, and the heart itself, were in this state. 13. The majority of the cows opened were in calf, and in all of them we perceived that the fœtus had been dead for a long time. The other viscera of the abdomen were in a healthy condition. 14. The cellular tissue was in many places swollen, and as if distended by gas. Among these different alterations there was much variety. 15. The mammary glands were retracted; on cutting into them a small quantity of yellowish-coloured milk was found. In one case the milk appeared to be little altered. The inflammatory engorgement of the small anterior lobes of the lungs, the inflammation of the stomach,—above all, that of the fourth compartment and the small intestines,—have been constantly found in all the cattle which have died from this epizoöty, and have been examined with care.

'This disease had much analogy to that which reigned in the southern provinces of France in 1775 and 1776. The eruption that appeared in many animals; the state of the stomach, the intestines, and the gall-bladder was the same; the course of the symptoms—which differed very little in these two epizoöties,—and the non-equivocal existence of contagion;—all combine to establish a great degree of similarity between the two epizoöties. But the thorax was particularly affected in that of Picardy; the cough and the gangrene of the small lobes of the lungs,—symptoms which never failed,—formed a distinction between them. In the epizoöty of the southern provinces, the lungs were certainly sometimes attacked with sphacelus, but not always. The animals experienced tremblings and convulsive twitchings, which were scarcely noticed in Picardy; and the rapidity of the contagion was incomparably greater. Malignant pleuro-pneumonia often gives rise to the same lesions in the lungs; but in this case the abdominal viscera are not constantly involved. The disease, then, which I have described bears a few features in common with the epizoöty mentioned by Lancisi and Ramazzini, and with malignant pleuro-pneumonia; but it differs from them in other respects. It might be regarded as a putrid contagious fever, which exercised its ravages at the same time on the viscera of the abdomen and chest.

'The first stage was announced by the cough and grinding of the teeth, by the diminution or suppression of the secretion of milk, or by a hard and full pulse. It was only then that we might hope for success from proper treatment. The beginning of the second stage was characterized by the total loss of appetite and by diarrhœa, without great depression or dulness. Towards the close of this stage, and during the third period, these two symptoms were very marked, and everything betokened a state of putridity, which, towards the termination of the disease, became extreme.

'The indications which it was proposed to follow in treatment were these:—1. To diminish the general inflammation, and, above all, that of the viscera contained in the chest and abdomen, and to dilute the alimentary matters which gorged the stomach. 2. To attempt to arrest the progress of the putridity which always existed in the last stage of this malady.

'The first indication was met in the following manner:—No food whatever was given to the animal from the moment it was suspected to be ill. It was often rubbed and wisped, and a blanket was put over its back. When the ventilation of the stable was imperfect, new openings were made. The diarrhœa, which was always present, and was very fetid, demanded this measure, and also that the stables should be often cleaned. When called in at the commencement of the attack, it was necessary to take advantage of this and to abstract blood from the jugular vein. Several pounds of blood were withdrawn if the animal was an adult; if the disease was little advanced, and the beast was robust and vigorous, this was repeated; but if one of these conditions was absent there was only the single bleeding. When the malady had reached the second stage, venesection was altogether abstained from, especially if there was an eruption about the neck, and if the suppurative process set up by setons was well established; this, however, did not apply to those animals yet in health, and in which setons had been used as a preservative measure. Five or six hours after blood-letting, if setons had not yet been applied, they were to be inserted underneath the skin of the dewlap by means of a needle; the tape was to be well smeared with some vesicatory ointment, and its

ends were to be loosely tied, so that it might be moved backwards and forwards, in order to make the necessary dressings more convenient and complete. The ointment was to be composed of two parts of cantharides with a sufficient quantity of laurel oil. With the design of favouring the suppuration, the tape was to be afterwards frequently smeared with digestive ointment. Hellebore root was also frequently employed in order to excite the formation of an abscess in the dewlap; this was opened, when fully formed, by means of a needle carrying an epispastic tape. The congestion of the lungs was attempted to be relieved in the following manner: Angelica root, an ounce and a half; sal ammoniac, two ounces, and camphor one ounce; all were to be pulverized and mixed to the consistence of an electuary with a sufficient quantity of simple oxymel, and then rolled up in a linen cloth and fastened in the mouth of the animal. The use of this *billot* was most salutary towards the end of the second stage, because it contained antiseptic substances, the employment of which was then indicated.

'The ordinary beverage allowed was thin gruel, prepared, when possible, with flour or oatmeal. When nothing but bran could be obtained, care was taken to have it well steeped in different waters and then filtered, in order to separate that portion which is not soluble, and which is of a very septical nature.

'There was also given, at the most four times a day, and at equal intervals, a bottle of the decoction of turnips in which was infused the flowers of mullein, and to which was added two or three drachms of nitre in powder. Nitre was also dissolved in the gruel, and a little vinegar added.

'Emollient enemas contributed to fulfil the same indication. They were prepared with the leaves of mallow and linseed. The mallow, mullein, and the turnips grow very abundantly in the parishes where this epizoöty raged, and it was for that reason that I recommended their use.

'The nasal cavities were frequently cleaned out by injections of a decoction of barley, to which was added a sufficient quantity of vinegar and honey.

'The use of the following preparations fulfilled the second in-

dication. They were had recourse to when the symptoms of putridity became manifest, and when the pulse lost its tone, became weak, and the artery flaccid.

Nitre, in powder	one pound.
Cream of tartar	four ounces.
Camphor	two ounces.

Pulverize the whole, and give half an ounce four times a day in the gruel.

'Take also four ounces of Peruvian bark, put it in three bottlesful of water, and decoct until there are only two, and give this in two doses. Sometimes this is sweetened with honey, and two drachms of camphor dissolved in a small quantity of Rabel water were added.

'One or other of these preparations was resorted to, according to necessity.

'When the animals became convalescent they were always very weak, and their strength had nearly gone; they have been even seen to die at this period for want of care. This unhappy termination was guarded against in giving a draught of infusion of junipers, or in mixing the extract of juniper with their drink. The dose of berries was an ounce to two pounds of gruel; that of the extract of juniper was an ounce and a half or two ounces.

'The treatment was terminated by a purgative prepared as follows:

Senna leaves	one ounce.
Boiling water	one pound.

Infuse the leaves in the water; afterwards dissolve an ounce of Socotrine aloes in it; allow it still to infuse, and when done enough give it in a tepid state to the animal.

'The cattle which it was desirous to preserve from the epizoöty were treated as follows: They were shut up, or kept as far from any dangerous communication as possible; one person only looked after them, and he never went near either infected stables or infected beasts. All dogs and other animals were carefully prevented from communicating with the cattle so guarded. The stables were kept well and properly aired, and it

necessary new openings were made. The quantity of their food was much diminished; they got green herbage to eat, and their drink was thin gruel, sometimes nitrated. The person who looked after them brushed and wisped them often. A seton of hellebore or medicated tape was inserted in the dewlap. Sometimes an appliance was fastened in the mouth, to which a piece of linen tied in a knot was fixed. This contained some stimulating substance, such as assafœtida, in a dose of one or two ounces. These simple and ready precautions sufficed to maintain a great number of dairies in a good state, and kept away the contagion.

'Besides these, the different precautions demanded by the law were carefully enforced. The syndics of the several parishes remitted to the sub-delegate a very exact account, containing the names and residences of the various parties whose cattle were attacked by the epizoöty, with the view of enforcing disinfectant measures, and preventing fraud and deception with regard to these.

'The dung and straw were removed from these stables or cow-sheds. The first was buried beneath a layer of earth as deeply as possible. If the straw was only in small quantities it was entirely burnt, but if there was a great deal of it, only that lying uppermost was burnt.

'The buildings were thoroughly cleansed; every corner was washed out—the walls, mangers, racks, and all woodwork were scraped, and the ground was dug up to a certain depth. Everything was freely washed, and plentiful use was made of boiling water in which lime or vinegar was mixed. For the same purpose a strong lye, made from the cinders of new wood, was employed; and this was sprinkled in all the angles, holes, and most out of the way corners. Brasiers full of red-hot charcoal were put in these habitations, and at intervals sulphur and nitre were burnt in them. The doors and windows were then left open, and some days afterwards all the walls throughout were white-washed with lime. No persons except those engaged in the disinfection were allowed to enter the stables.

'Among the necessary measures employed, some were of a purely medical character, the others belonged to the legislative

department. I divided the infected country into three districts, in each of which a veterinary surgeon (*artiste vétérinaire*) was stationed, to see that the treatment of the cattle was conformable to the plan which had been traced.

'The disease being contagious, and the locality in which it reigned being in the immediate neighbourhood of Mercantère,—a canton very rich in cattle,—the district of Hesdin, and the valley of Conche in Artois, I believed it to be indispensable tó have *cordons* of troops to prevent the epizoöty from spreading into them. With this view, detachments of soldiers were lodged in the localities yet unaffected, and within half a league of the suffering districts. The sentries on duty marched continually backwards and forwards in communication with each other, and prevented all dangerous communication. Rivers, and other likely places, were taken advantage of to intercept intercourse; no cattle were allowed to enter these *cordons*, neither were any permitted to come from the interior of those districts where the epizoöty was prevalent. When it made further progress, the *cordons* fell back to the proper distance in the yet healthy districts. There were also detachments of troops in all the infected or suspected localities. Their duty was to make a particular enumeration of all the cattle; to visit these twice a week, but yet not to touch them; to give timely notice to the veterinary surgeons, or other inspectors empowered to carry out the orders of the king, when there was an animal affected; and, above all, to watch that the numbers of the cattle in these places were neither diminished nor increased without being duly reported to their superiors. They were also to see that all graves were at least eight feet in depth, and that there was one for each dead beast; that these were to be covered with firmly-trodden earth; they were also to inspect the old graves, and to have them filled up when sunk below the level. The disinfection of the stables, though under the direction of the veterinary surgeon, was to be carried on in their presence. They were to prevent cattle from travelling or stopping on the highways or in the communes; all dogs were to be shut up, or if found at large, or even in the yards of their owners, they were to be destroyed, and the masters' names, if discovered, were to be reported. When necessary, they were

to resort to severe measures, in order to carry out the orders of the king. In giving these orders to an officer who was to have command under such circumstances, it was easy for him to distribute his men in such a way as to prevent the transmission and the deadly effects of the epizoötic contagion.

'I thought that the best way to make known the danger of this epizoöty would be to find out how many head of cattle had died in a district of eight parishes, and how many had been cured from the 10th of July, the date of the outbreak, till the 7th of September. In consequence of this, the syndics of these parishes ordered an exact statement to be prepared, and it is from these that I have been able to draw up the following table.

Parishes.	Animals which have died of the epizoöty.	Animals cured of the epizoöty.	Animals sick.	Animals yet healthy.
De Rossan	68	61	—	—
De Maintenai	41	20	10	151
De Nampont-Saint-Firmin	95	99	10	57
De Montigny	43	20	2	4
De Preaux	56	27	—	22
De Nampont-Saint-Martin	33	4	—	187
De Noyelles	36	31	33	10
De Vron	13	1	13	390
Totals .	385	263	68	821

'The results of this enumeration are as follows: from the 10th of July to the 7th of September—1. 385 head of cattle died, and of these 298 succumbed before help could be given; 2. 263 animals were cured, out of which 207 had been treated according to the method laid down in this Memoir; 3. 68 cattle remained sick, of which number 51 have been cured; 4. 821 beasts remained unaffected. In this statement it is seen that the total of those which died surpasses the number cured; but it is necessary to observe—1. That the majority of the cattle perished before my arrival. 2. That the peasants had killed a number in having recourse to a régime truly incendiary. As a proof of this, I may mention that 13 cows at Vron succumbed in a few days to the treatment of a shepherd, who administered to them a decoction of the most irritating kinds of herbs, such

as hellebore and others. 3. That when skilled people have been called in in good time they have succeeded in curing nearly two-thirds.

'The various measures I have indicated, and which were carried out by an enlightened and active magistrate (the Count d'Agay, intendant of Picardy), conformably to the views of a minister whose memory will always be dear to the French nation (M. Necker), and by whose orders I went to this district, have had the greatest success. Mercantère and the neighbouring districts of Artois have been preserved, and the contagion has ceased towards the middle of the month of September, 1779.'[1]

At Steyermark, in Austria, according to Adami, 10,000 head of cattle perished from the Cattle Plague alone.[2] In Styria, nine-tenths of those attacked died, and Belgium was nearly robbed of the whole of her herds.[3]

A.D. 1780. The winter of this year was very severe in Europe and America, the spring-time cold and damp, the summer dry and in some places very hot, and the autumn cloudy and heavy. There was an eruption of Mount Vesuvius and Mount Etna, and a tremendous earthquake at Tauris. Catarrhal and other fevers were very common in mankind. Spain was ravaged by locusts. In Saxony a disease or 'rot' affected the eggs of bees (*couvain pourri*) from 1780 to 1783. Catarrhal fever or 'influenza' among horses occurred at Paris;[4] and at Lille epizoötic ophthalmia attacked horses and cattle.[5] Anthracoid maladies were very frequent over the whole of France, particularly in the provinces of Paris, Provins, Bas Berry, in Sologne, Poitou, Orleans, Franche-Comté, Champagne, and Dauphiné; affecting all the domestic quadrupeds, and even the geese, fowls, and turkeys. Heusinger calls attention to the fact that gloss-anthrax broke out this year in France, and that in the preced-

[1] *Vicq-d'Azyr.* Précis Historique de la Maladie Epizoötique qui a régné dans la généralité de Picardie en 1779. Mémories de la Société Royale de Médecine. An. 1779.

[2] *Adami.* Beiträge zur Geschichte der Viehseuchen, &c. Vienna, 1781.

[3] *Wirth.* Op. cit., p. 185. See also *Lamper* and *Weiss.* Ueber das Ansteken der Viehseuch. 1783.

[4] *Huzard.* Journal de Méd., vol. liv. p. 337.

[5] *Chabert.* Instructions, &c., vol. i. p. 391. See also p. 379.

ing epizoöties of this malady its origin could be generally traced to this part of Europe, from whence it spread with its usual celerity and distinct characteristics. It commenced in April, and advanced regularly and progressively from Forez to Lyons, and on the Rhône to Dauphiné; as well as on the banks of the Saône. It was supposed to have been caused by the heavy fogs and dews prevailing on the pastures, as all the animals kept in stables and fed on dry forage escaped.[1] In the spring-time, the same malady was affecting cattle at Mantua.[2]

Previous to this period, the sugar-eating ants (*formica saccharivora*, Linnæus) appeared in such numbers in the Island of Grenada, as to put a stop to the cultivation of the sugar-plant, and a reward of £20,000 was offered to any one who should discover an effectual method of destroying them.[3]

A.D. 1781. The summer was very hot. Locusts in Germany. A great epidemy of influenza commenced in September of last year in China, and travelled through Asia in this year; in December it was at Moscow; and in February, 1782, it arrived at Revel and Eastern Prussia; still spreading over Europe, it was in Spain and Italy in the months of August and September.[4] In the spring it was in America. In England, an epizoöty was fatal to horses and horned cattle; of one hundred and sixteen horses located in one barrack stable, all but thirteen were attacked, and seventy-eight died.[5]

The bovine epizoöty appears to have been the Cattle Plague, or what was then named the 'distemper.' The Annual Register says, for March: 'At the beginning of this month the distemper among the horned cattle broke out in the Isle of Thanet. It began at Mrs Cowell's, at Salmston, near Margate, and is supposed to have been brought over from Ostend by two sheep-skins, which being thrown on the beach were taken up with some sea-weed, and laid on a dunghill. At these a cow smelt, and rolled

[1] *Bredin.* Ibid., p. 379. [2] *Volpi* and *Ferdenzy.* Ibid., p. 212.
[3] *Castle.* Philosophical Transactions, vol. xxx. p. 346.
[4] *Gluge.* Influenza.
[5] *Bascome.* Op. cit., p. 138. This author's accounts are exceedingly brief and unsatisfactory, and in consequence of his not giving his authorities, are almost worthless.

on them. Six other beasts died at Manston; five more were shot there, and buried on the 9th; several others died; some were shot. On the 12th, an Order of Council was issued (as usual) prohibiting the removal of distempered cattle, and ordering them to be killed, and buried at least four feet deep, with their hides slashed, &c. Two more were seized with it at Minster on the 16th, and immediately killed and buried. By the above and other precautions, it is hoped that it will spread no further. Some had been previously removed to Ash and Chislet, though nothing seems easier than to confine them in this island, there being only three outlets, viz. at Sandwich, Sarr, and Reculver.'[1]

A communication in the same volume refers to this contagious distemper, and makes the following remarks: 'Farmers have no need to be informed how important a matter the preservation of their cattle is. The considerable advantages they reap from them when free from accidents, and the losses they suffer when distempers spread among their herds, are sufficient motives to make them feel the interest they have in preserving their cow-houses, stables, &c., from the infection, and in using all possible means to prevent its progress. But as fatal experience has proved that the use of medicines, with the powers of which they are not well acquainted, has been frequently more prejudicial than salutary in the epizoöty, and that country people, by placing an unlimited confidence in pretended specifics, purchased at a very high price, have very often been drawn into a double loss, by the death of their cattle, as well as the expense of such drugs; it is thought the communication of an efficacious and cheap manner of treating cattle when attacked by this distemper,' &c., the treatment being bleeding and giving drinks.[2] Epizoötic ophthalmia appeared among cattle in Flanders; it was attributed to the hot weather, and to the use of forage full of insects.

A.D. 1782. The brown-tailed moth occasioned such alarming devastations in the vicinity of London, that rewards were offered for collecting the caterpillars; and the churchwardens and overseers attended to see them burnt by bushels.[3]

[1] The Annual Register, vol. xxiv. p. 168.
[2] Ibid. p. 99.
[3] *Kirby and Spence.* Entomology, vol. i. p. 209.

Influenza was epidemic in many countries, and remarkable for its bilious characteristics. Forster says for 1781: 'In spring prevailed the influenza in America, and next year in Europe. . . . Clouds of sand martins in London. Beetles and cockchafers this year were numerous; hornets in plenty, wasps few or none.' For this year: 'Earthquake in Calabria, contemporary with great fall of barometer in Scotland. Early spring severely cold, with April floods. In March the memorable influenza prevailed all over Europe; in England its particular range was very easily to be traced; effects of this epidemic were sudden, and it was among the most recent striking proofs of the atmospherical nature of these peculiar morbific stimuli. The epidemy assumed more of a violent nature towards May.[1]

An epizoöty of influenza in horses appears to have prevailed in Europe at the same time as the epidemy in man. Huveman observed and reported upon it, as it manifested itself in Germany; and Abilgaard, the talented founder of the Veterinary School at Copenhagen, has left an admirable monograph on the disease, which he had ample opportunity for studying during the period it affected the King of Denmark's stallions.

The Annual Register says for May, 1782: 'The weather was uncommonly severe, not in England only, but almost all over Europe. At Vienna the frost continued so rigorous, that the vines were thought to be materially injured. In Italy such a fall of snow as has never been remembered. In Russia many thousands have perished of a sickness owing to the rigour of the season. In Sweden men and cattle have perished for want of food. In the Highlands of Scotland cattle die, or are killed, for want of fodder. In short, the severity of the weather has been generally felt.'[2]

In Germany, Metzger mentions a bilious disease affecting horned cattle at the same time as influenza in man.[3] From this year until 1785, at Bray, in the Seine-Inférieure, France, epizoötic ophthalmia, complicated with 'albugo' or ulceration of the cornea, was observed in cattle.[4] In the arrondissement of

[1] *Forster.* Op. cit., p. 171. [2] The Annual Register, vol. xxv. p. 207.
[3] *Metzger.* Geschichte der Frühlings-epidemie, p. 35.
[4] *Cloquet; Chabert.* Instructions Vétérinaire, vol. iv. p. 312.

Chartres, from this year until 1784, Barrier witnessed 'distemper' in dogs prevailing as an epizoöty. There was also an epizöoty among cats at this period, which was thought to be of the same nature as the distemper in dogs: 'The cats are also subject to this disease (distemper). We have had occasion to see many farmers in the neighbourhood of Chartres, who have usually a score of cats on their farms, lose the whole of them by this disease during the winters of 1782, '83, and '84.'[1]

The Cattle Plague was so severe in Holland in the last and this year, that more than 300,000 head of cattle were lost.[2]

With regard to the epidemic influenza prevailing in England at this time, Dr Darwin has the following remarks, which I think worthy of reproduction. 'The catarrhus contagiosus is a frequent disease amongst horses and dogs; it seems first to be disseminated amongst these animals by miasmata diffused in the atmosphere, because so many of them receive it at the same time, and afterwards to be communicable from one horse or dog to another by contagion. These epidemic or contagious catarrhs more frequently occur amongst dogs and horses than amongst men, which is probably owing to the greater extension and sensibility of the mucous membrane which covers the organ of smell, and is diffused over their wide nostrils and their large maxillary and frontal cavities. And to this circumstance may be ascribed the greater fatality of it to these animals.

'In respect to horses, I suspect the fever at the beginning to be of the sensitive, irritated, or inflammatory kind, because there is so great a discharge of purulent mucus; and that, therefore, they will bear once bleeding early in the disease, and also one mild purgative, consisting of about half an ounce of aloe and as much white hard soap mixed together. They should be turned out to grass both day and night for the benefit of pure air, unless the weather be too cold (and in that case they should be kept in an open airy stable without being tied), that they may hang down their heads to facilitate the discharge of the mucus from their nostrils. Grass should be offered them, or other fresh vegetables, as carrots and potatoes, with mashes of malt or of

[1] *Barrier.* Ibid. [2] *Heusinger.* Op. cit., p. 261.

oats, and with plenty of fresh warm or cold water frequently in a day. When symptoms of debility appear, which may be known by the coldness of the ears or other extremities, or when sloughs can be seen on the membrane which lines the nostrils, a drink consisting of a pint of ale with half an ounce of tincture of opium in it, given every six hours, is likely to be of great utility.

'In dogs I believe the catarrh is generally joined with symptoms of debility early in the disease. These animals should be permitted to go about in the open air, and should have constant access to fresh water. The use of being as much as may be in the air is evident, because all the air which they breathe passes twice over the putrid sloughs of the mortified parts of the membrane which lines the nostrils and the maxillary and frontal cavities—that is, both during inspiration and expiration—and must therefore be loaded with contagious particles. Fresh new milk and fresh broth should be given them very frequently, and they should be suffered to go amongst the grass, which they sometimes eat for the purpose of an emetic; and if possible should have access to a running stream of water, as the contagious mucus of the nostrils, both of these animals and of horses, generally drops into the water they attempt to drink.'[1]

A.D. 1783. The winter was mild; the spring and summer damp; but the latter season was particularly hot and stifling. Early in the year, singular atmospherical phenomena were observed in the kingdom of Naples, and on the 5th of February a series of earthquakes began at Calabria, which lasted until the 28th of March. Eruptions of Vesuvius were continuous. On the 5th of February a dense black cloud hung over Calabria, which necessitated the lighting of candles at mid-day, so much did it obscure the daylight; and at the same time the odour of sulphur and asphalt was insupportable. This vapour or smoke spread over the whole of Italy, and even to Tunis, in Africa, and had not disappeared in September. 'On the 9th of February, a fog having the odour of burnt leaves spread over New England, the ground there being under snow. A famine in the Carnatic

[1] *G. Darwin, M.D.* Zoonomia, or the Laws of Organic Life. London, 1796. Vol. ii. p. 230.

followed. On the night of the 29th of March, a splendid *lumen boreale* in America. In England it appeared January 13th, and in February the marshes of the Lea were under water for 10 days. There was much mistiness, which began to overspread Europe in June, during the eruption of Hecla; and previous to it, Ireland was covered with blue vapour, and the springs dried up. On the 31st of May, a large meteor was seen in Virginia. On St Helen's day, Monday, 18th August, in England, was observed the great and memorable meteor, which crossed Europe from NN.W. to SS.E., blazing and leaving corruscations in its train. It was seen about half-past eight, by Mr B. M. Forster, at Walthamstow, who was so amazed at its magnitude that he jumped out of a window to observe it better from the garden, and he describes its course as attended with noise. The same year, in October, tremendous gales and high tides occurred. In some parts great rains fell, and in others earthquakes were felt. Great fog at Amsterdam in December. The disorders of health kept pace with these convulsions of nature. *Distemper among cattle began in England at Derby.* Greece, Smyrna, and the Crimea were subject to the plague, and that disease produced the most dreadful ravages in Egypt, where it continued all the next year. In various parts of Europe and America the scarlatina and the measles were epidemic.'[1] 'A distemper among the cattle in Derbyshire; a royal proclamation issued to prevent the spread of the disease.'[2] In the month of May volcanic eruptions took place in Greenland, and an island was thrown up from the bottom of the sea, between that country and Iceland; while a heavy black cloud hung over the latter place, which, on the 24th of May, was observed at Copenhagen. On the 1st of June there were frequent shocks of earthquake felt in Iceland, and on the 11th a tremendous eruption of the volcano Skaptar Jokul. These eruptions and earthquakes lasted until November, and more than 20 villages were destroyed; 9336 human beings perished, with 28,000 horses, 11,461 cattle, and 190,488 sheep. This loss of life and property was caused partly by the noxious vapours which impregnated the air, partly by the depre-

[1] *T. Forster.* Op. cit., p. 172.

[2] *Webster.* Op. cit.

dations of the lava, and, in part, by the famine resulting from the showers of ashes throughout the island, and which destroyed the vegetation; and also by the desertion of the coasts by the fish.[1] A black smoke covered the island, and was observed throughout Europe during the whole summer, especially towards the end of June was it observed in the most distant regions when the wind began to blow from the north. In Germany we have the effects of this terrestrial commotion noted as follows: 'This vapour arose first in June, and lasted the whole of July and August almost without cessation. It caused a sensation of warmth, and the weather was often excessively hot; the sun was not quite obscured, but had generally a fiery red appearance, which was noticed by night as well as by day. I observed no particular smell, but the haze was of a dry nature, and it did not prevent rain or storms, though it appeared injurious to the plants; I well remember that most of the trees lost all their leaves from it. . . . Since 1783, I have never again seen such a dense wide vapour with all its peculiarities; all those I have since observed have been the usual fogs.'[2]

The best description of this serious catastrophe in Iceland is that given by a competent observer, the Etatsroed Stephenson, who was present during the latter part of the calamity. From this description we will make the following pertinent extracts. 'After the first breaking out of the fire (after the 1st of June), a great quantity of ashes, sand, and sulphureous dust was thrown over the adjacent districts, particularly those of Siden and Fliotshverfet. The long continuance of westerly winds, too, drove the sandbank away from Skaptarlungen to the place just mentioned; and the vast quantity of burning sand falling around scorched up all the grass in the fields about Fliotshverfet to such a degree, that there were no means of support for the cattle, and the inhabitants fled from all the farms in this district, excepting the most easterly one, called Nupstad, which, together with the neighbouring farm of Raudaberg, remained uninjured by the hot

[1] *Lyell.* Principles of Geology.

[2] *Finke.* Naturhist. bemerk. über den Moordampf., p. 26.

[3] Kort Beskrivelse over den nye Vulcans Ildsprudning i Vester-Skaptefields Syssel paa Island i aaret, 1783. Copenhagen, 1785.

ashes. . . . . It will be easily conceived, that, in proportion as the air became more and more filled with ashes, sand, sulphur-dust, and the smoke and aqueous vapours arising from the burnt districts, it must likewise become more fetid and unwholesome; and, indeed, even intolerable to those who, at such a time, could scarcely draw their breath. The presence, too, in the atmosphere, of this mass of extraneous particles, obstructed in some measure the light and warmth of the sun, and caused to prevail, even at the height of summer, a most piercing and unnatural cold; in addition to which, what was still more unseasonable, a heavy fall of snow took place on the 11th and 21st of June. It was, however, soon melted. Almost all the new eruptions were accompanied by showers of hailstones, of an extraordinary size, equalling that of a sparrow's egg. These caused much damage and destruction to the grass, and nearly killed both men and cattle; but the mischief occasioned by these was trifling, in comparison of what was caused by the heavy rains,[1] which, mixing with the sand, ashes, and sulphur, that had before fallen in immense quantity, incrusted the fields with a kind of black coat, somewhat similar to ink, but thicker, which poisoned the grass, and rendered the water stinking and unfit for use. Even the rain itself, in descending, became impregnated with sulphur and ashes, which sorely affected the eyes, caused a giddiness in the head, and was attended with pain as often as it fell on the naked body. . . . . I have already hinted that the damage which the pastures have sustained from the torrents of rain are incalculable, for these, accompanied with the most dreadful peals of thunder, have not only in many places rendered the surface of the earth for ever unproductive, by dislodging from the neighbouring eminences great fragments of rock, but have elsewhere materially

[1] During one of the heavy falls of rain, it is stated by Holm, that 'there was observed at Drontheim and at other places in Norway, and also at Feroe, an uncommon fall of sharp and salt rain, which was so penetrating, that it totally destroyed the leaves of the trees, and every vegetable it fell upon, by scorching them up and causing them to wither. At Feroe, there fell a considerable quantity of ashes, sand, pumice, and brimstone, which covered the whole surface of the ground, whenever the wind blew from Iceland; and the distance between these two places is at least eighty (Danish) miles. Ships that were sailing between Copenhagen and Norway were frequently covered with ashes and brimstone, which stuck to the sails, masts, and decks, besmearing them over with a black and pitchy matter.'

injured vegetation by covering the ground with black dust, mixed with the hair-like ravelings, ashes, sand, and sulphur; thus poisoning the animals, and consequently cutting off the very life-springs of the inhabitants. The feet of the poor cattle, and their heads, as far at least as their eyes, and the inside of their mouths, became changed, by their going into these pastures, especially such as are damp and marshy, to a sulphureous yellow colour, and were filled with wounds and boils. . . . . The volcano likewise affected the fisheries in the year 1783; as the thick clouds of smoke and dust, which continually covered the land, rendered it too dangerous for the fishermen to put out to sea. In the district of West Skaptefield the fire had a still greater and more destructive effect on the trout-fisheries, in the fresh-water lakes; for a larger quantity of volcanic ashes and sand had naturally fallen here than in other parts of the country, and these imparted an unusually blue colour, sometimes tinged with yellow, to the waters, which at length became so foul and putrid, that great numbers of the fish were driven dead upon the beach. . . . . Exclusively of the damage and loss occasioned to the fisheries by the fire, this calamity has likewise driven from the country various kinds of birds that used to build their nests there, among which the principal were the swans. The inhabitants were well acquainted with the time that these birds cast their feathers, which was in the month of August, when the people used to climb the rocks and take a great number of them; but the sulphureous smoke and stench effectually banished them all; and the few eggs that were found in the deserted nests were so thoroughly impregnated by the smoke, as to be unfit for eating. . . . . What influence the volcanic eruption has had on the growth of the grass, and the miserable consequences that have ensued from the failure of the latter, cannot be described in few words. It is easy to conceive that the progress of vegetation, in the district of Skaptefield, where the fields were immediately covered by the poisonous black substances, must unavoidably be stopped. But the misery was far from being confined to this place alone; for, even out of the district, where the volcanic sand and sulphureous ashes did not fall in any considerable quantities, the growth of the grass, which, until the eruption

took place, was in a most promising state, was after this time totally prevented. Plants of all kinds withered, and became so brittle, that the mere treading upon them reduced them to powder. The first that felt the baneful influence were the Buttercup (*Ranunculus acris*), in Danish called Smörurt, and the Fisilen (*Leontodon Taraxacum*). The Elting (*Equisetum fluviatile*) was the last to suffer. The same poisonous dust also attacked the cabbages and other vegetables in the gardens, totally checking their growth; and having thus extended itself over the whole country, caused a general failure of the crops of grass. Not, however, equally in all places; for the want was particularly experienced in the northern district, where, according to report, the united produce of several farms at Langanæs was not more than sufficient to feed a single cow. It is true that the number of horned cattle and sheep was already greatly decreased, previously to the eruption; a circumstance which was partly occasioned by a succession of bad years, *and partly by the infection that had recently prevailed among the sheep, and had induced a necessity of destroying great numbers.* But still the loss was most severely felt; for, in the autumn of 1783, the natives were obliged to kill more than a third, nay, in some parts, even the half, of their remaining stock of cattle, for want of fodder. What is further remarkable is, that in the summer of 1783, the pastures in many places swarmed with little winged insects, of a species hitherto unknown in Iceland. These were of blue, red, yellow, and brown colours, and appeared nearly to resemble the earth-fly. They were particularly troublesome to those employed in securing the hay, who were soon covered with their unwelcome guests. Many people have assured me that they even found numbers of them still living among the hay, in the depth of the ensuing severe winter; and, what is yet more extraordinary, that they left their quarters after a day or two of thaw or mild weather. . . . . In consequence of the deficiency in the pastures, and particularly of the poisoned state of the herbage, a great mortality naturally ensued among the cattle. In the district of West Skaptefield, where the fields were entirely covered with the infectious sand, ashes, and sulphur, mixed into a pasty consistency by the heavy rains; where the showers of red-hot stones

and pumice had totally destroyed the face of vegetation; where a stinking and suffocating smoke, accompanied by tempests, continual lightnings, thunder, and noises in the air, heavy subterraneous reports and dreadful shocks of earthquakes, obscured the atmosphere; where a terrific stream of fire, a melted mass of lava, had urged its impetuous course; in short, where all the most fearful phenomena in nature had concentrated themselves, as it were, in one spot, it was common to see the animals running about the pastures as if in a state of madness; and I am credibly informed, that many of them, unable to find food, or even shelter to defend themselves from the surrounding horrors, in a fit of desperation, plunged into the fire. The cows were in many instances secured and fed in stalls, but the sheep and horses were dispersed in such a manner, that scarcely half of the original number could again be collected. All the quadrupeds of the island had thriven wonderfully, and gained strength, during the mild winter and beautiful spring of 1783, but this did not prevent them from dying off in considerable numbers during the week or fortnight immediately subsequent to the eruption, with inflammatory diseases caused by the poisonous quality of the food. Such was particularly the case with the sheep, of which, in the district of Skaptefield, it was remarked that, whereas in Iceland they generally walked facing the wind, they now regularly turned away from it; naturally anxious to avoid the strong sulphureous smell, which the infected breezes brought along with them.

'As the cold, too, at a distance from the fire, was unusually piercing, they instinctively approached the current of lava, by which many of them were overwhelmed and destroyed, in spite of all the exertions that were made to save them. Nor was the situation of the cows and horses much better; for, although the disease was to them not equally fatal, yet they became excessively lean, and, even in the best season of the year, the cows gave scarcely any milk. It was the same beyond the West Skaptefield district, and indeed nearly throughout the whole island. It was still further remarked in different parts of Iceland, during the summer of 1783, that the sheep, in direct opposition to the experience of the inhabitants, and to the supposed natural propensity of the animals themselves, avoided the dry elevated places,

and even the heaths and commons, which most abounded in rich grass; and, as soon as they were driven up to the heights, snuffed at the earth and searched among the grass, but without tasting it: then immediately turning round, ran to the morasses and wet places. The cause of this I attribute to the circumstance of the ashes and sulphureous dust having had a more permanent influence upon the elevated pasturage, than upon the herbage in moist and low situations, where a proportion of the ashes and sand must have sunk into the water, and where, besides, the grass, when rain fell, must have been much purified and refreshed. It may possibly be objected to this, that the rain would naturally also produce the same beneficial effects in the higher grounds; but it is, on the other hand, to be remarked that the grass and herbage on heaths and commons, where sheep principally delight to go, is small and short. Consequently, as often as a heavy rain fell upon the ashes and sulphureous dust here collected, these were converted into a kind of paste which could not penetrate the soil; so that all vegetation was covered with it: whereas, in the morasses, this paste was gradually dissolved in the watery soil, and, as the grass in such situations generally rises to a considerable height, the mixture of ashes only affected the lower part of it. This I therefore consider to be the cause why the sheep, during the summer of 1783, uniformly sought the moist places; and it may further be added, that they there in some degree found a shelter from the penetrating cold and frequent tempests, which are much more prevalent in the hilly country than down in the valleys.

'In addition to the inflammatory disease just mentioned as so fatal to the sheep, so early as the commencement of autumn, 1783, when they were collected from the hills, several of them were found to be attacked with a distemper hitherto unknown to the natives. The poor animals could neither walk nor stand: their teeth were loose, so as to prevent them from chewing their food; their cheeks were full of swellings; and their joints were contracted. Towards Christmas the sickness began to show itself in a still greater degree, even among the stall-fed sheep, and also among the horned cattle, which rendered it necessary for them to be slaughtered. Many, however, fell victims to the

distemper much sooner than was expected, when the disease attacked them internally. Thus it was often found that the heart, liver, lungs, and kidneys of these miserable animals were covered on all sides with boils and ulcers. They were in some cases much swollen, in others quite destroyed and hollowed out; one of the kidneys was frequently greatly enlarged, while the other was proportionately shrivelled. The jaw-bones were perforated, as if they had been bored with an instrument, and the ribs were knit together in a most extraordinary manner. The bones were reduced to a substance resembling gristle, and even the hardest became so tender at the joints, that they might easily be separated from each other. When the entrails that had been diseased were boiled, they shrivelled very remarkably, and, if merely rubbed between the fingers, turned at once to powder. Of these particulars I was an eye-witness; for, when we arrived in Iceland, in the middle of the month of April, 1784, this plague was in its full vigour, and I can with truth assert, that the greater number of the cattle then alive on the island fell victims to the distemper during my stay there. Having said thus much concerning the sickness of the quadrupeds, I will only add, that it has been generally more destructive among the sheep than the horned cattle, and that there are some parishes, amongst which are Muhle and Rangervalle, and others in the west country, where the latter have been comparatively but little affected.

'According to information that we have received, the disorder has in some degree made its appearance in the districts of Guldbringue and Kiose, and likewise in various places in the west country; but still its greatest ravages have been in Skaptefield, Aarnes, Borgefiorde, Myhre, and Hnappedal, and, indeed, through the whole of the north of the island. From the east no intelligence has yet been received of its having broken out there. In some horses, which I had the opportunity of seeing during my journey to the place of the eruption, the distemper exhibited the same external appearances as in the other cattle; but the teeth in those I examined were not yet become loose. It was a melancholy sight to see the miserable and deplorable state to which these poor creatures were reduced. In one instance in particular, it

was really astonishing how the wretched animal could walk, or even stand upon its legs; and yet its owners, in the confusion and distress occasioned by their flight from the spot, were under the necessity of laying a burthen upon it. No striking external marks of the disorder were perceptible among the horses out of the district of Skaptefield, but it has nevertheless prevailed there, if not as the sole cause, yet certainly in union with others, to produce a general destruction both among them and the horned cattle; many having died suddenly when they had a plentiful supply of hay; others when in pastures where there was a sufficiency of grass, of which they were never deprived either by ice or snow. To our utter astonishment, we saw horses in the most miserable state of leanness in the richest meadows, and even actually starved to death, having preferred eating substances the most injurious, such as the wood of houses, the hair from each other's coats, or whatever else was within their reach, rather than touch the grass of last year's crop, still remaining in the pastures. This appears to me to be a sufficient proof of the poisonous state of the herbage during the year 1783; and, although the circumstance has not yet been investigated, I am fully convinced that the internal organs of the horses have been, equally with those of other animals, infected with the distemper. The few inhabitants who had still left them some of the old hay in the year 1782, preserved their cattle in a healthy and good condition; but even here, when the new hay came into use, the disease began to appear among them.

'I have further to remark, that during the last summer several of the younger beasts were recovered by feeding upon the new grass.

'It might seem contradictory were I here to assert that the whole destruction among the cattle is to be considered merely as an effect of the volcanic eruption; because I have before stated that, in certain districts which were within the operation of the fire, no particular distemper has yet made its appearance. I must, nevertheless, still maintain my opinion, that the fire has mostly contributed towards it, since this was, beyond a doubt, the cause of the unwholesome air and frequent tempests, as well as of the failure of the crops of grass and hay, in the summer of 1783.

The cattle had, at the close of that season, become remarkably lean, and consequently were rendered unfit to withstand the rigours of the ensuing winter, one of the most severe hitherto known. The inhabitants had not by any means a sufficiency of provender for them, nor were they aware at first of the unwholesome and poisonous quality of that which they did possess. It may be easily supposed that the inclemency of the weather greatly contributed to the destruction, although the fire itself was the principal and original cause of it. . . . . That the eruption had likewise a powerful effect on the human frame is certain, and is the less to be wondered at, as the unwholesome and pestilential air, operating together with the noxious water and food, and with the want and distress occasioned by the destruction of the cattle, must naturally be productive of sickness and distempers. Diseases of the most inveterate kinds, in the form of scurvy, broke out in sundry places, and those even far distant from the fire; as, for instance, in the districts of Guldbringue, Borgefiorde, and Myhre, especially in the first. The district of West Skaptefield was, however, the chief seat of this distemper; and in only six parishes there, no less than one hundred and fifty persons were carried off between the commencement of the new year and the month of June following, but some of these perished by famine. The same symptoms showed themselves in this disorder in the human race as among the cattle. The feet, thighs, hips, arms, throat, and head were most dreadfully swelled, especially about the ankles, the knees, and the various joints,—which last, as well as the ribs, were contracted. The sinews, too, were drawn up with painful cramps, so that the wretched sufferers became crooked, and had an appearance the most pitiable. In addition to this they were oppressed with pains across the breast and loins; their teeth became loose, and were covered by the swollen gums, which at length mortified and fell off in large pieces of a black or sometimes dark-blue colour. Disgusting sores were formed in the palate and throat, and not uncommonly, at the termination of the disease, the tongue rotted entirely out of the mouth. This dreadful, though apparently not very infectious, distemper prevailed in almost every farm in

the vicinity of the fire during the winter and spring. . . . . It is necessary for me here to remark, that the disorder principally attacked those who had previously suffered from want and hunger, and who had protracted a miserable existence by eating the flesh of such animals (not even excepting horses) as had died of the same distemper, and by having recourse to boiled skins and other most unwholesome and indigestible food. (I have been assured, in the district of Skaptefield, that the flesh and milk of sick animals had a remarkably unpleasant taste, and that, in particular, the milk was of an unusually dark and yellow colour.). . . . . The loss of the horned cattle and sheep was very severely felt by the Icelanders; but that of the horses was equally so, especially by the inhabitants of the interior of the country, who thus found themselves deprived of their last resource, the means of having provisions and other necessaries conveyed from the coast through long and tedious roads. Nay, many who are totally destitute of horses, are under the necessity of carrying every load of hay into the outhouses upon their own backs, and frequently from a very considerable distance; nor is there any prospect of these invaluable animals being soon replaced.'[1]

In this year 'rabies canina' was epizoötic in the Island of Jamaica, and, it is asserted, for the first time. Moseley says: 'During my residence in the West Indies, I never heard anything of this disease; and from the most particular inquiries, I am fully convinced that, before 1783, the rabies had not appeared upon many, if any, of the islands.'[2] It appeared in the spring in Hispaniola, and in June in Jamaica, where it continued until March, 1784. It was supposed to have originated spontaneously, and it became general. Many negroes were bitten and died; and swine, goats, and horses were also wounded and perished with symptoms of hydrophobia.

The epizoöty of malignant anthrax which has been noticed as prevailing in the French West Indies, or Antilles, for some

[1] *Hooker.* Tour in Iceland, vol. ii. See also *Brugmans.* Verhandeling over een Zwavelagtige nevel, p. 11. Knobloch Sammlung, vol. ii. p. 522. *Lord Dufferin.* Letters from High Latitudes, p. 113.

[2] *Moseley.* Von den Krankheiten zwischen den wendezirkeln, p. 29.

previous years, appeared this year in the Island of Grenada in a most severe form. We are indebted to Mr Chisholm for a description of it; and, as Heusinger remarks, this description is not only important with regard to the epizoöty itself, but to veterinary surgeons and others it is most worthy of notice, from the fact that it may serve to explain the famous 'milk disease' of modern days which has appeared in the United States of America, and also because it is the only epizoöty of this kind in which the concomitance of malignant anginā in man can be placed beyond a doubt. Chisholm says: 'In the year 1783, in the Island of Grenada in the West Indies, a very singular coincidence took place. Late in that year the cynanche maligna appeared in several parts of the island, for the first time observed, I believe, by the oldest inhabitant in that or any other of the West Indian islands. The symptoms of this disease were most violent, and its rapidity to a fatal termination most alarming. But the circumstances which gave the greatest singularity to this disease was its concomitancy with a contagious distemper of a very extraordinary nature,—an epidemic among the cattle and mules in the same parts of the island wherein the cynanche maligna appeared. Both were new and unknown, and both were concomitant, insomuch as to render it difficult to perceive whether they proceeded from a cause common to both, or whether the cynanche was an effect on the human race of an imported contagion, which seemed peculiarly, in the first instance, to affect the horned cattle and mules. These animals whilst feeding, and apparently in perfect health, in the pastures, suddenly fell down dead. The malignity of the disease had so rapid a progress, that seldom could other symptoms, or rather any symptoms, be observed:—sometimes a few minutes before death the animals were languid, lay down, and neglected their food. Sometimes a swelling of the glands of the throat formed a large tumour, which might be perceived for some days before death; but though this swelling sometimes suppurated, and though the matter was discharged, it never proved critical. On dissection, the whole course of the trachea or œsophagus, the stomach, and greater part of the intestines, were found in an inflamed or gangrenous state. Various modes of cure were adopted, but, except in a few cases, always

without effect. . . . . On those plantations where care was taken to burn the carcases of the diseased cattle, no further consequences resulted. But they unhappily were few. On those where this precaution was not used, and, indeed, it is surprising that it should be used in any, seeing that the disease was new, and its effects unknown, the flesh of the cattle that died being dug up and eaten by the negroes, proved most dreadfully septic, producing a pestilential carbuncle, attended by a malignant fever. There were not wanting instances of the iniquitous practice of offering the flesh of the diseased cattle for sale, and on these occasions, such was the highly septic nature of this poison, that even touching the flesh, in such manner as that part of the sanies adhered to the finger, produced the same fatal consequence. . . . It will be considered a very extraordinary fact that the cynanche maligna disappeared a short time after the lues bovina. My friend, Dr John Stewart, who had the best opportunities of seeing both diseases, for it was chiefly within his practice they occurred, writes to me: "I went to Grenada early in 1774, but I neither witnessed nor heard of any instance of the cynanche maligna in that island until the end of 1783, nor did it appear after 1786, until I finally left the island in 1797." . . . . The lues bovina, I have said, is a very rare disease within the tropics. I have been assured by a gentleman long resident in Jamaica, and owner of considerable cattle-pens, that nothing of the kind has, to his knowledge, occurred there; and it is certain neither Brown nor Ling have noticed it in their valuable works: it has appeared in Barbadoes only, as far as I have been able to learn; and there it seems to have assumed the same alarming aspect, and to have produced the same devastation among the horned cattle, and, in many instances, to have given rise to similar consequences among the human race we have found it marked by in Grenada. The learned historiographer of Barbadoes, the Reverend Mr Hughes, gives no information relative to the origin of this distemper in that island, but he thus describes it: "Among the distempers which infect the horned cattle, there is one of a very contagious and pestilential kind, for a beast shall seemingly, by his feeding heartily, and in appearance, be otherwise well, yet in a few hours, without any symptom of a pre-

vious disease, drop down and die. These, when dead, are by the most judicious planters immediately buried, and often there is a watchman appointed to prevent the new-bought negroes and others of the poorer sort from digging up the carcases and feeding upon them; for when this happens it generally costs them their lives, especially if they eat the liver, or any part of the entrails. In this case the distemper breaks out in the shape of plague-boils, near the armpits or temples." He adds: "I have known one very extraordinary instance of its virulency—a negro woman was carrying upon her head, in a wicker basket, a piece of this flesh that had been newly cut off from a dead distempered carcase, and a few bloody sanious drops fell through the basket upon her breast. In a few hours she was swelled all over, and was not able to move a limb, and in about two days there appeared mortifying ulcers in every part where the drops fell, and though speedy methods, &c., were used, the whole breast and adjacent affected parts were taken off close to the bones.". . . . A distemper equally fatal prevailed in some districts of Barbadoes in the year 1795. In the month of April of 1796, I made a tour of the island, and at the plantation Apeshill, near Hole's town, had the following very curious information from our host, Mr Cummins, a very intelligent and respectable planter. The malady was fatally epidemic on this plantation, and carried off more than 50 head of cattle, and the number of negroes who died in consequence of eating the flesh of the diseased animals was also considerable. The description which Mr Cummins gave of it, proved its identity with the Grenada distemper of 1783-4, but he could assign no cause for it. A very singular instance of the excessive virulence and diffusive power of this poison occurred in his own family. One of his children, a girl of three years old, during the prevalence of the epidemic, took for her breakfast one morning so large a portion of milk as to leave a very scanty allowance to the other children. This milk was taken from a cow which unfortunately then laboured under the distemper. At the end of four days, the child was seized with all the usual symptoms of the plague, sore or malignant carbuncle, which had been observed to take place in the negroes who ate of the flesh of the diseased cattle. She recovered with

the utmost difficulty, but the deep mark left by the carbuncle on her arm still remained.'[1]

After the great heat of the summer at Wetzlar, in Germany, cattle were observed to die very suddenly, probably from the disease we have just been describing.[2] The same malady (anthrax —here called *Fenyn*) was very frequent in Dutch Friesland in the month of September.[3]

The same affection was remarked in France in August,[4] and Brugnone tells us that it committed dreadful havoc among the horses of some regiments of dragoons at Fossano, near Turin.[5] Gangrenous pneumonia was observed among cattle at Limousin by Bourgelat,[6] and this author says that glanders (which may have only been catarrh) was general among horses at Paris in the spring and summer.[7] A malignant and contagious form of dysentery, which may have been the Cattle Plague, appeared among the cattle in the Venetian provinces of Friuli, Padua, and Verona, from the month of September, 1783, until March, 1784.[8]

A.D. 1784. The winter was long and cold. In Siberia the *Yasva*, or anthrax, was calculated to have destroyed more than 100,000 horses.[9] 'In July, 1784, at Chalons and in its neighbourhood, the cows and mares have nearly all aborted.'[10] According to Bottani, in February glossanthrax prevailed at Bergamo, Italy.[11]

It is recorded in the Russian Agricultural Archives, that the Cattle Plague passed from Hungary into Italy in this year. This probably refers to last year's invasion. Wirth says it extended to Germany.

A.D. 1785. Canine madness raging all over the Northern

[1] *C. Chisholm.* On the Lues Bovina Intertropica. Edinburgh Medical and Surgical Journal, vol. vi. pp. 33, 36.
[2] *Held.* Anweisung das Rindvieh zu behandeln. Wetzlar, 1783.
[3] *Camper.* Krankheiten welche Thieren und Menschen gemein sind, p. 23.
[4] *Chabert.* Op. cit., vol. iv. p. 259.
[5] *Brugnone.* Instructions, &c., vol. vi. p. 227.
[6] Journal de Paris, 1785. [7] Beiträge z. Thierarzneik, vol. i. p. 226.
[8] *Bottani.* Vol. iii. p. 97.
[9] Annal. de Méd. Vét., 1854.
[10] *Moiseau.* Instructions, &c., vol. vi. p. 130.
[11] *Bottani.* Vol. iii. p. 113.

States of America, concurrently with measles in the human species.[1] The Gazettes of this year abound with accounts of its dreadful effects.[2] It continued during the following year. Many cases of hydrophobia were observed in the Southern States of America, and in July, in that country, the weather was so hot that the thermometer in the shade stood at 103°.

In the summer, glossanthrax broke out in the duchy of Nassau. 'In the year 1785 a long and severe winter was followed by a wet and cold summer, in which the disease spread itself over this district for the third time, and this epizoöty appears to have continued in other districts during the years 1786-7. In April of the year 1785, the malady broke out at Nassau, and till May and June of the same year it ravaged the district between the Rhine and the Lahn. It was the general opinion at that time that hairs grew out of the tongues of the animals, and these were supposed to be the cause of the disease. In a report it is stated, that at the root of the tongue these sprung up so strong as to be like thorns, injuring the palate, and producing putridity of both these parts, whereby at last the cattle lost their tongues and died. In this epizoöty, however, but few animals appear to have perished. From that time anthrax of the tongue has never been seen in the dukedom; whether it be owing to altered conditions for developing the malady in this neighbourhood, or whether it will again appear at another time, are questions beyond the power of answering.'[3]

White, in his Natural History of Selborne, mentions in this year a remarkable visitation of *aphides*, or 'smother-fly,' in his village on the 1st of August.[4]

A.D. 1786. Anthrax was very prevalent and severe this year in many countries. In the country of Lippe, for instance, it reigned at the end of this and beginning of the next year, among horses and cattle. 'In a cow attacked by the disease, where the pustule will break, you will first perceive a redness on the frænum of the tongue, and within six hours a hard swelling will appear. In some animals, either at once or soon after this enlargement

[1] Courant. Aug. 1, 1785. [2] *Webster.* Op. cit., vol. i. p. 455.
[3] *Franque.* Op. cit., p. 122.
[4] *G. White.* The Natural History of Selborne. Jardine's Edit., para. 53.

shows itself, there will be seen a small vesicle about the size of a pea; in others only a yellowish-brown spot. Hereupon—often within six hours—you will find a hole about two inches in diameter, which, in many instances, is from three to four inches deep, and appears as if eaten out of the organ. The interior of these cavities looks like a yellowish-grey fringe, or as if covered with short hair of that colour, and smells very foul. The tongue begins to swell, a ropy mucus flows from the mouth, and in bad cases the cattle have a painful tumour under the jaw.'[1]

At the end of August, the disease entered by the frontiers of Suabia and Franconia into Bavaria, and attacked not only cattle and horses, but also sheep and pigs.[2] In Italy, it passed into the States of the Church by the frontiers of Ancona, and continued to spread, in 1787, in Piceno and other places. Its symptoms did not vary much, but in some quarters its ravages were very severe, and possibly in various localities where Cattle Plague prevailed, the destruction caused by that scourge may have been attributed to the glossanthrax.[3] Malignant anthrax also attacked animals in many countries: in Transylvania, in Schonen, and in Sweden horses, cattle, and pigs suffered;[4] in Hanover gangrenous erysipelas (a variety of the same disease) destroyed many pigs: to such an extent, indeed, did they perish, that in some provinces one-third, one-half, and even two-thirds of their number disap-

[1] Lippische Verordnung. Beitr. z. Thierheilk, vol. iv. p. 133.

[2] *Will.* Kurzer Unterricht über den jetzt herrschenden Zungenkrebs. München, 1786.

[3] The following works contain a description of this serious epizoöty. *Bonsi.* Istruzione Veterinaria sulla presente Epidemia Contagiosa. Venice," 1801. *G. Fantini.* Sull Epidemia Contagiosa insorta nel Piceno. Jesi, 1787. *P. Orlandi.* Sulla vera Origine del Cancro Volante, che produsse Grave Mortalita de' Buoi Nello Stato Pontificio. Rome, 1787. *L. Petrini.* Memoria dell' Epizoözia Bovina del 1786. Loretto, 1786. Heusinger admits that the history of this epizoöty of glossanthrax is incomplete, and his observations on the disease are very instructive. History shows us that all the great invasions of the malady have originated in sub-alpine France—in Dauphiné or Auvergne, and have spread from thence as from a centre, sometimes but a short distance, at other times a long way in every direction, and generally by Germany into Poland, though never reaching England. Of this, however, we cannot be quite certain. It is remarkable that the invasions of ekzema ('foot and mouth disease'), when on a large scale, have always followed an exactly opposite course—from east to west—from Russia even to England. See that for 1838-41.

[4] *Flormann.* Neue Schwed. Abhandlung, vol. viii. p. 209.

peared.[1] In France anthrax appeared at Moulins, and in Dauphiné,[2] but, perhaps, most notably in the month of July, in the province of Quercy, department of Lot, where it was propagated over a wide extent of country; it only broke out among cattle, but it was in many instances transmitted to men and mules.[3] In Savoy epizoötic croup was prevalent. 'Although the croup was not contagious, yet it was sometimes epizoötic. In the latter case, it was surprising that the animals of every age should be observed in the year 1786 to suffer in a few communes of the department of Sesia. The greater portion of the bovine species was attacked by the disease.'[4]

In some parts of Bavaria pneumonia seriously affected cattle, and rot also prevailed among sheep.[5]

Arquinet observed the catarrhal fever or 'distemper' of dogs in an epizoötic form at Pézenas, in the month of July. He also complains of the dreadful ravages it had caused among dogs in that neighbourhood for upwards of twenty years.[6]

A.D. 1787. The epizoöties of glossanthrax and pneumonia continued this year in Italy and Germany. In February, on the banks of the Iser and the Danube, in Bavaria, an epizoöty of sheep small-pox broke out, and was very deadly.[7] This attack lasted for many years; the disease has, indeed, been supposed to prevail there more or less since that time.

In Ireland, 'The wetness of the season excited apprehension of disorder among the sheep—particularly the murrain;'[8] which was characterized by *blisters upon the mouth.* Was this a mild form of the glossanthrax so prevalent on the Continent?

A.D. 1788. The weather in this year was very irregular, the changes of temperature being very sudden and severe. The winter in England was long and hard. The summer temperature was very high, and storms were frequent. Influenza was

[1] Hannöv. Magaz. 1786, p. 1207.

[2] *Chabert.* Instructions Vétér., vol. ii. p. 279.

[3] *Desplas.* Sur la Maladie Charbonneuse qui a attaqué les Bestiaux du Quercy en 1786. Instructions, &c., vol. ii. p. 283.

[4] *Toggia.* Mal. de Buoi, vol. i. p. 31.

[5] *Plank.* Veterinär-topographie von Baiern, p. 137.

[6] *Wirth.* Op. cit., p. 215.

[7] *Laubender.* Op. cit., p. 133.

[8] Dublin Chronicle.

observed in mankind. During and after the heat, anthrax appeared so suddenly in some parts of Germany, that in the small districts of Pfaffenhofen, Neustadt, Vohburg, and Krandsberg, 247 horses, 389 oxen, and 201 pigs died before any assistance could be obtained.[1]

The same malady raged in Silesia during the summer, and in the month of August it made great havoc among cattle in the marshy country of Villeneuve-les-Cerfs, department of Allier, in France.[2]

A.D. 1789. The winter was cold in Europe, and the long and severe frost did much damage; the summer was wet, and the autumn cold. Earthquakes were felt in Iceland in July, September, and November; the latter shocks were experienced in Scotland and in Italy. A remarkable circumstance was observed in this year: the codfish did not appear at the usual fishing-ground at Newfoundland, neither did it visit the English coasts or the Baltic at the usual time. In the month of July, however, great quantities were observed about the coasts of Norway, Lapland, and Archangel, dead or dying.[3] It had been remarked in 1788, that almost all the codfish taken on the Banks of Newfoundland were thin and sickly, and when dried were little better than skeletons, and scarcely saleable in foreign markets. Mildew destroyed much corn in Scotland.[4] In America, in the month of October, an almost universal darkness overspread the land, and diseases were very prevalent in the form of anginas, croup, and bilious fevers.[5] In this year the crops failed, and cattle also perished in considerable numbers in North America. In that country, dogs likewise suffered much from rabies, and in the State of New York a man died of hydrophobia, induced, it was supposed, from his having skinned a cow that had died of that malady. Influenza was very severe in New York and Philadelphia, and over a large tract of that continent; at the same time there was great mortality among the horses in Maryland.[6] Canine rabies was epizoötic at Münster, in Westphalia.[7]

[1] *Laubender.* Op. cit., vol. i. p. 134. [2] Instructions, &c., vol. iv. p. 256.
[3] *Abbs.* Philosophical Transactions, 1792.
[4] *Sinclair's* Scotland. [5] *Bascome.* Op. cit., p. 140.
[6] Courant, Dec. 31, 1789. [7] *Wirth.* P. 236.

There was a great epizoöty among fowls in Upper Italy, which has been described by Dr Baronio. It was contagious and very deadly. Baronio says: 'The disease manifested itself by an universal dulness, which was accompanied by a grave diminution of strength; the combs were perceptibly flabby and pendulous; the interior of the mouth was covered with a viscid matter; the anus was very red, and the feathers looked soiled and shrivelled. To these phenomena there succeeded fever, which was revealed by the sudden and great heat that could be felt under the wings and in the limbs. The fowls looked excessively dull; they drooped their wings, and their crests became livid; the feathers became curled up under the head; they refused all food and water, and death soon ensued.[1] Examinations of the dead bodies of these fowls were made by Monteggia and Perlasca; the lungs were perceived to be more or less inflamed, and often covered with a great exudation of plastic lymph; the liver was healthy; in the crop and the stomach grains of oats were found blackened, but not otherwise changed; the intestines were filled by a large quantity of greenish mucus, but sometimes this was of a reddish tinge like the mucus of dysentery; in all those opened after death round worms (*ascarides*), in great numbers, were found in the intestines. The dead bodies soon passed into a state of putrefaction. The mortality began to show itself in the beginning of September, 1789, around Pavia, and from thence northwards in Lumellina, Casale, Vercelli, and other places towards the mountainous districts; while southerly, it advanced to Milan and the lower Milanese territories. In August, 1790, it was still reigning, and a tremendous loss of fowls had been the consequence of its visitation; in a single village, for example, in a few days three hundred fowls had been destroyed by it. Its propagation by contagion was proved by many and frequent observations, and it was undoubtedly demonstrated that those fowls which were kept entirely apart from diseased ones escaped.[2]

[1] *G. Baronio.* Sulla Corrente Epidemia delle Pollastre. Milan. 1789.

[2] See also *Toggia.* Storia della Costituzione Vermin. ed Epizoötica dei Polli, in the 'Giornale Scientifica et Letterar. di Torino.' 1798. *Brugnone.* Descrizione dell' Epizoözia dell Galline serpeggiante in questa città. Milan, 1790.

In Wurtemberg, in this and the following years, many cattle and sheep died from rot and flukes in the liver. 'In the past spring, one had, at Klein Glattbach, frequent opportunities of verifying the following observations: many of the pregnant ewes suffering from flukes in the liver brought forth lambs, all of which, although they had no other sustenance than their mothers' milk, nor had been ever driven to the meadows, or drunk water, yet after a short time died from the malady their parent had; in all about thirty-five perished. On examination, flukes of a small size were found in their livers, the gall-bladders were much enlarged, and half a measure of water was found in the cavity of their abdomens.'[1]

In Croatia, Krain, and the Tyrol, an epizoöty of what was said to be malignant dysentery was very deadly,[2] but Heusinger is of opinion that it was probably the Cattle Plague.

Enzoötic anthrax killed many cattle in Auvergne, France.[3]

At Cairo, during the plague in man, cats died in large numbers.[4]

Drought and death of cattle in Antigua, West Indies. 'In the year 1789, there was no fall of rain for seven months, whereby there was not only no crop of sugar, but 5000 head of horned cattle perished for want of water.'[5]

A.D. 1790-1. In America the winter was very severe; the spring and summer was cold, but dry, and catarrhs and yellow fever prevailed. Blight destroyed the fruit and other vegetable productions, and caterpillars and other parasites ate up the grass and corn, especially in Maryland.[6] In April, 1790, was a prodigious draught of shad fish at New York, which was said to forebode the pestilential fever that began in autumn.[7] In Germany every species of clover was covered with honey-dew blight (*mehlthau*). In many provinces of France rot, dropsies, and diseases caused by vermin were prevalent. From May until Sep-

[1] *Bilhuber.* Ueber die Egelkrankheit unter dem Rindvieh und den Schafen. Tübingen, 1791.

[2] *Bottani.* Op. cit., vol. iii. p. 124—140.

[3] Instructions, &c., vol. ii. pp. 268, 280.

[4] *Enrico di Volmar.* Pest., p. 178.

[5] *B. Edwards.* Hist. West Indies, vol. i. p. 485.

[6] *Bascome.* Op. cit., p. 141.

[7] *T. Forster.* Op. cit., p. 174.

tember, the several varieties of anthrax were frequent, and in Normandy small-pox in sheep was rife.[1] In Bavaria and Suabia anthrax appeared in the month of June; and in Saxony hæmaturia in sheep, which was supposed to be caused by the larvæ of the *curculio pisi*.[2] In Bavaria, pleuro-pneumonia was epizoötic among cattle.[3]

Huzard describes the appearance of the same malady, which prevailed for a considerable distance around Paris in this year and in 1794.[4] Up to 1789, according to Lafosse, this most destructive disease had been nearly always, if not entirely, confined to the Jura and Swiss Alps, the mountainous districts of Dauphiné, the Vosges, Piedmont, and Upper Silesia. Towards the end of the century, however, it is very probable that the wars following the French Revolution were the cause of the extension of this plague: the requirements of the various contending armies necessitating droves of cattle being drawn from the regions where the contagion reigned enzoötically; and these, attached to the commissariat parks, and travelling into other countries, would convey the germs of the disease among hitherto untainted herds. Neither the altitude, physical configuration, geographical position, meteorological conditions, nor geological character of a country, appear to have exercised any palpable influence in the diffusion or vitality of the contagion; neither does the nature of the food, plants, stabulation, or race afford exemption from its attacks when once introduced. As we shall see hereafter, this is one of the most wonderful maladies, in these respects, with which we are acquainted, and its history affords a most interesting study.[5]

In Townson's Travels in Hungary, mention is made of an epizoöty of an anthracoid nature, which attacked the horned cattle in that country, Servia, and the Bannat of Temeswar, in the year 1790. This attack, according to Kirby and Spence, was caused by a minute fly or gnat; for, concerning its true genus, they tell us there is some doubt amongst entomologists—

[1] *Chabert.* Instructions, &c., vol. i. p. 399.
[2] *Laubender.* Op. cit., vol. i. p. 160. [3] Ibid. p. 161.
[4] *Wirth.* Op. cit., p. 300.
[5] *Lafosse.* Traité de Pathologie Vétérinaire, vol. iii. p. 616.

Fabricius calling it a 'Rhagio' (*Rhagio Columbaschense*); while Latrielle, a more modern and perhaps better authority, sets it down as a 'Similium;' but to whatever genus it belongs, says Kirby, it is certainly a most destructive little creature. In Servia and the Bannat of Temeswar, it attacks the cattle in infinite numbers, and penetrates, according to Fabricius, their generative organs; but according to another account, their noses and ears, and by its poisonous bites destroys them even in the short space of four or five hours.[1]

On the authority of Chabert, we are informed that the Spanish sheep foot-rot (the *pedero* of the Spaniards), a contagious malady, was imported into the Pyrenees, and was particularly prevalent on the banks of the Gironde and Lower Medoc.[2]

A.D. 1792. The year was damp and rainy. In May and June locusts devoured the grain in New York, and the wheat insect caused great destruction to the crops in Long Island and in Maryland. The lime-trees at Philadelphia were destroyed by a kind of caterpillar.[3] Rot in sheep caused great destruction in England.[4]

Pneumonia was epizoötic among cattle in Franconia,[5] and what was called malignant fever (but which may have been the Cattle Plague) raged in the Tyrol and in the province of Polesine.[6] Abortion was epizoötic among cows in Italy. Toggia says: 'It was most difficult to successfully prevent pregnant cows from aborting in damp or wet localities, where the heavy fogs at the end of the autumn had been very chilly, and had lasted for many consecutive days; for to all these influences the animals had been exposed. On account of this, abortions were very frequent in mares and cows around Mantua and Lumellina, and more especially was this accident inevitable if the cow came from a dry climate, and passed all at once into a damp or rainy atmosphere, particularly if it were also cold. This was what happened to the cows from the mountainous regions of Lanzo, and also to those from Cuorgnè, which chiefly in the month of October descend to the plains and meadows to pasture; and it

[1] Entomology, vol. i. p. 150.
[2] *Chabert.* Op. cit.
[3] *Bascome.* Op. cit., p. 142.
[4] *E. Harrison.* An Inquiry into the Rot in Sheep and other Animals. 1804.
[5] Journal von und für Franken., vol. vi. p. 710.
[6] *Bottani.* Op. cit., p. 144.

not unfrequently happens that the autumn is very rainy and accompanied by thick fogs and cold winds when they are depastured there. From a similar cause, this accident was very prevalent towards the end of November, 1792, and, indeed, became epizoötic among the cows belonging to the farmers of Lanzo. So serious did it become in the pastures around Turin, that the number amounted to about seventy.'[1]

Epizoötic dysentery caused great destruction among the horses and cattle lodged in the casemates, during the siege of Mayence. It was supposed to have been induced by insufficient or improper food, and a neglect of cleanliness and ventilation.[2]

A.D. 1793. The winter was cold, the spring dry, and the summer one of the hottest on record for a hundred years. A curious incursion of lemmings (*Myodes Norvegicus*) took place in a district of Lapland. 'In August, 1793, an incredible number of mountain-mice, called lemmar, descended upon Enontekis, and in the following summer some were still seen scattered here and there; whereas, during forty years nothing of the kind had ever appeared before, nor have any of them been seen since.'[3] Dysentery and yellow fever were severely felt as epidemies in America, and the last-named disease was very deadly in the West India islands. In Europe, dysentery was very prevalent, and at the same time anthracoid diseases destructive in the lower animals; more especially was the latter class of diseases common in France, according to the statement of Gilbert. 'The extraordinary and sudden heat in the summer of 1793, developed the germs of this destructive pest. In addition to this, the damp mouldy fodder of the previous year had predisposed those which fed on it. At the commencement of the hot weather, carbuncular diseases appeared in the departments of the Nièvre, of the Upper and Lower Rhine, Vienne, and of the Indre, as well as other of the southern departments. Citizen Godin treated this disease in the districts of Belac and St Innien with much success, and published an excellent treatise on his experience of it. He remarked

[1] *Toggia.* Malattie dei Buoi, vol. ii. p. 313.

[2] Nouveau Dict. &c., Vétérinaires, *art.* 'Dysenterie.'

[3] *Clark.* Travels in various Countries of Scandinavia, &c. London, 1838, vol. i. p. 410.

that the animals which were first attacked with the disease, and which nearly all died, had been fed during the whole winter with mouldy, muddy forage of the very worst quality.

'This is confirmed by the statement of Lacroix, veterinary surgeon of Poitiers, who, in an excellent description of the disease, indicates the best treatment to control it. I myself have had a hundred opportunities of observing this malady and its causes in Argenton, in the department of Indre, where I also had occasion to treat it. It raged there fearfully; attacked all animals without distinction, and destroyed nineteen-twentieths of those affected by it. It was only transmitted to mankind by the sting of those insects which had sucked the blood of the diseased beasts. I have convinced myself that all the cattle which took the complaint spontaneously, and not by contagion, had been kept on bad, mouldy, and spoilt forage. . . . . After the small-pox of sheep, I know no disease of animals more contagious than this putrid gangrenous fever. I do not know a single species which is exempt from attack, and it passes with extreme facility from one to another. It seldom prevails that it does not cost the life of some selfish or imprudent men, who contract it either when removing the skin from the dead animal, or emptying its rectum with the naked arm when alive.

'When I arrived, in 1793, in the district of Argenton, to combat this malady, a great number of citizens had already been affected with veritable carbuncles, and many had died. I had the satisfaction of saving all those who had any confidence in my advice. When opening an ox that had died from the malady, a drop of blood which had got through the texture of the glove I usually wore on my hand sufficed to induce a small ulcer, which I only checked on the spot by burning it deeply with a red-hot iron. The horse I rode was also attacked, notwithstanding my precautions for preventing him touching, immediately, any diseased animal; it was cured in the same manner. I have seen a sow and eight young ones die nearly all together, after having smelled the bloody traces left by a cow when dragged away to be buried. Fowls, turkeys, geese, and even blackbirds and starlings, died after having pecked at the blood of animals affected with the disease. In a dairy belonging to

the citizen Godeau, owner of the forges of Ablon, the manager having lost some cows, was advised, in order to stop the malady, to bury one in the cowshed. The carcase was soon interred, but the two animals which stood nearest to the spot were quickly affected. I could not disinfect this stable until the little soil that covered the dead beast was removed and replaced by a large quantity of lime; then a small hillock of earth was raised over it, in order to prevent the escape of the putrid emanations. A farmer of Saint-Benoit-du-Sault, district of Argenton, after having lost all his cattle from the malady, had them replaced by others which he had brought from an estate twenty leagues off, where the disease had not been seen. But about fifteen days after their occupation of the same cowshed these also were attacked, and owed their preservation to my assistance.

'Nothing contributes so much to the dissemination of these kinds of maladies as the shallow pits in which the dead bodies are interred. Dogs, wolves, and bears disinter them, and in doing so nearly always perish; but, frequently, not until after they have communicated the malady to other animals, and have sometimes carried the virus to very great distances. I have seen two bears and a wolf perish in one day from eating the flesh of a horse that had died of the malady. After having been assured that the flesh of an ox that had died from this affection had caused the death of several dogs, I was anxious to know if the cooked flesh would possess this deleterious property; the dog to which I gave it was not affected. This experiment, however, does not suffice to allay apprehension with regard to the danger of eating the flesh of diseased cattle; for I have also observed, though rarely, that dogs could eat the raw flesh of animals that died from anthrax with impunity. . . . . I have seen a horse attacked with a carbuncular tumour on the haunch some hours after having carried on its croup the fresh hide of a diseased beast enveloped in a sack.'[1]

In Bavaria, anthrax was dreadfully fatal among horses and

[1] *F. H. Gilbert.* Recherches sur les Causes des Maladies Charbonneuses dans es Animaux, &c. Paris, 1795. See also *Gilbert and Lacroix.* Instruction sur les Moyens de guérir la Maladie que Régne sur les Bestiaux dans les Départ. de la Haute Rhine. Vienne, 1793.

cattle from July until October, after the great heat of the weather, scanty forage, and scarcity of water.[1]

In this year, the events of war again made that terrible scourge, —the Cattle Plague, known to many countries. It was imported into Lombardy by Russian and Austrian troops, who drew their supplies of cattle and oxen from those regions in which the disease is indigenous, or the cattle of which are liable, when exposed to certain exciting causes, to develope it. At the end of the year it was introduced into Piedmont by Hungarian cattle destined for the supply of an Austrian army, and which communicated it to the cattle of Lomeline, and of Alessandria, Novara, and Tortona; it was soon spread all over Italy, where it prevailed until 1801. The Italian epizoöty has been ably described by the undermentioned authors.[2] Sheep were said to be attacked by it in Friuli, as well as the horned cattle. In 1795, it was carried into Southern Germany, and it raged with great fury in Bavaria, Suabia, Baden, Wurtemberg, Franconia, Hesse, and Nassau, being brought or maintained there by the continual passage of droves of Hungarian cattle, which traversed those countries to reach the Austrian army on the Rhine, or by the passage of troops who took with them infected cattle as their supplies. The German writers have left us exact descriptions by which the disease may be easily identified; those of Walz for Wurtemberg, Ackermann and Will for Bavaria, Stoll, Metzler, Reich, and Megele may be here mentioned, as well as Albert, Reich, and Schaller for Erlangen.[3]

[1] *Laubender.* Ueber den Milzbrand. Munich, 1814, p. 163.

[2] *Buniva.* Mémoire sur l'Epizoötie Bos-Hongroise, &c. Turin, 1793. Ibid. Mém. cont. le provvidenze contro l'Epizoözia nelle Bovine. Turin, 1797. Ibid. Raggionamento sull'Eccidio, &c. Turin, 1798. *Moscati.* Compendio di Cognizioni Veterinarie. Milan, 1795. This work contains also the observations of Dehò, Gherardini, and Bonvicino. *Bottani.* Vol. vii. pp. 149—217. *Adinolfi, Sanseverino, and Zacchiroli.* Compendio di Osservazioni, &c. Spoleto, 1801.

[3] The principal German works on the epizoöty at this period are the following:— *C. G. Fred. Albert.* Historia Pestis Bovillæ, by Gothfredus Fleischmann. Erlangen. De Lues Bovillæ. Origine et Natura. Erlangen, 1797. *Kausch.* Kameralprinzipien über das Rindviehsterben. Berlin, 1793. *Schallern.* Deutliche Anweisung die Loserdürre zu erkennen und sicher zu heilen. Baireit, 1797. *Reich.* Richtige und gewissenhafte Belehrung für den Landmann über die Rindviehseuche und Inoculirung derselben. Nürnberg, 1798. *Stoll.* Beobachtungen über die Rindviehpest für Thierärzte, Physiker und Polizeibeamteten. Zürich, 1800. *Frank.* Ueberädie Rinderpest und die Mittel sie zu heilen und auszurotten. Berlin, 1802. *Walz.* Natur und Behandlungsart der Rinderpest, &c. Stuttgart,

In the year 1796 it was brought to France, entering by the eastern departments. Here it was, as usual, attentively observed by Huzard,[1] Brassier, and Guersent,[2] and in Holland, where it also appeared in this year, it was reported upon by Forsten. From 1798 until 1801, it prevailed in Switzerland, and in 1799 it was causing great destruction in Bohemia, Westphalia, Poland, and other regions in that part of Europe.[3] The various authors who have written on this epizoöty, as will be observed, are too numerous to be quoted in our brief chronological history; it may therefore suffice to say that it was neither so general nor so deadly as the visitations of 1711 and 1745, owing perhaps to its nature and the means for suppressing it being better understood. Its prevention, and not its cure, was discovered—or rather once more proved—to be most profitable. It is calculated that it destroyed more than a hundred thousand cattle before it was extinguished in 1802. The descriptions of the symptoms, the facts of its contagious and deadly nature, and the inutility of attempting to cure the infected, are but repetitions of what was written by observers in the previous invasions of the plague.

A.D. 1794. An earthquake at Naples, and an eruption of Vesuvius, which destroyed the city of Torre del Greco. In Britain, during the month of January, rains were frequent and heavy, and as a consequence floods did much damage. The summer was very hot, and anthrax was again very deadly in Bavaria.[4] In the Tyrol and Verona 'ekzema epizoötica' was prevalent among cattle.[5] In the south of France, the horses and mules of the French army were affected with 'mange' to a very serious degree; the disease was transmitted to, and propagated among, the soldiers.[6]

1803. *Sauter.* Beiträge zur Kenntniss und Heilung der Rindviehseuche. Ulm, 1804. *Will.* Bemerkungen über die gewöhnlichsten Entstehungs- und Verbreitungsursachen der sich in Baiern so sehr vermehrenden Viehseuchen aller Art. München, 1799. *Benekendorf.* Abhandlung von verschiedenen Seuchen des Rindviehs. Berlin, 1791.

[1] Instruction sur les Maladies Inflammatoires Epizoötiques et particulièrument sur celle qui affecte les Bêtes à Cornes des départements de l'Est, &c. By *MM. Huzard* and *Desplas*, Veterinary Surgeons, Paris.

[2] *Guersent.* Essai sur les Epizoöties. Paris, 1815.

[3] *Lorinser.* Op. cit., p. 29. *Nebel.* Op. cit., p. 9.

[4] *Laubender.* Op. cit., p. 165. [5] *Bottani.* Op. cit., vol. vii. p. 148.

[6] *Longchamps.* Mémoire sur la Maladie Galeuse qui affecte en ce moment les

A.D. 1795. The winter was cold and the summer hot, damp, and rainy, after a late spring. Fruits were destroyed by blight, and disease caused great loss among vegetables, especially potatoes and cabbages. Paper hangings and other furniture were destroyed by the universal damp, which generated a white mould. Anthrax yet very common and fatal in Bavaria; and in France small-pox committed great ravages among sheep.[1] An epizoöty appeared among horses in Bavaria which was named 'epizoötic catarrh,' but which Plank says was acute glanders (*akuter rotz*); it was believed to have been imported from Austria.[2]

In this year, and also in 1811, Despallens describes the disease in calves due to the presence of filaria in the air-passages, as being very prevalent.[3]

A.D. 1796. The summer was hot and dry. A severe earthquake destroyed the whole country between Santa Fé and Panama, including the cities of Cusco and Quito. The seasons were intemperate in the United States, and bilious and remittent fevers were common among mankind.[4] Malignant anthrax appeared among cattle in Lombardy.[5] The Austrian troops introduced the acute glanders mentioned last year as prevailing among horses in Bavaria, into Franconia; one author, however, (Pilger) asserts that he had already observed this disease in 1795, and from that time until 1797, on the banks of the Rhine. It destroyed many horses. The Military Train horses particularly suffered from the malady, which was transmitted to very many of the solipeds in the towns and villages, and caused great damage.[6]

From 1796 to 1803, but especially in the years 1797 and '98, the egg rot was very destructive among bees in Saxony. 'The disease showed itself in 1796, after the bees had suffered

Chevaux, Mules, et Mulets de l'Armée Francaise, du Midi, qui s'est propagée sur presque tous les Chevaux des propriétaires, et atteint les particuliers qui les soignent. Castres. During the Crimean war, I was in medical charge of a large number of horses which were severely affected with mange, and had ample opportunity for observing that the Turks who attended to them, rode them, and slept beside them, using the saddles as pillows, suffered greatly from itch.

[1] *Gilbert.* Op. cit. [2] *Plank.* Op. cit.
[3] *Despallens.* Procès-Verbal, &c., à l'Ecole Vét. de Lyon, 1812.
[4] *Bascome.* Op. cit., p. 144. [5] *Bottani.* Op. cit., vol. vii. p. 144.
[6] *Laubender.* Op. cit., p. 241.

much from the severe and long winter, and an unusually cold and hungry spring. It continued during similar springs, when the irregular weather and the severe storms damaged the vines. Not a single vine was spared, and this misfortune spread as far as the Elbe, lasting for seven years.'[1] A great mortality among geese and fowls occurred in America; death was very rapid.[2]

An epizoöty among cats in Holland. 'The excellent physician and naturalist, Professor Schacht of Harderwyk, wrote to me in May, 1796, that the cats of that neighbourhood had been attacked with a peculiar skin disease, which had the appearance of scabies. They had also an acrid, stinking discharge from the eyes, which at last blinded them. It was observed that in the previous months, from February to April, they were excessively lascivious and their night cries were particularly loud.'[3]

In this year Dr Darwin of Derby writes: 'The *parotitis suppurans*, or mumps with irritated fever, is at times epidemic among cats, and may be called *parotitis felina*; as I have reason to believe, from the swellings under the jaws, which frequently suppurate, and are very fatal to those animals. In the village of Haywood, in Staffordshire, I remember a whole breed of Persian cats, with long white hair, was destroyed by this malady, along with almost all the cats of the neighbourhood; and as the parotitis or mumps had not long before prevailed amongst human beings in that part of the country, I recollect being inclined to believe that the cats received the infection from mankind, though in all other contagious diseases, except the rabies canina can be so called, no different genera of animals naturally communicate infection to each other; and I am informed, that vain efforts have been made to communicate the small-pox and measles to some quadrupeds by inoculation.'[4]

A.D. 1797. The winter was long and cold, and the summer rainy. Catarrh in England in the spring. 'Was also a year of great blight.'[5] The same epidemics that were noticed last year were causing much mortality in America. 'In Quito, so destruc-

[1] Die Faulbrut oder Bienenpest. Dresden, 1804.
[2] *Webster.* Op. cit., vol. i. p. 520. [3] *Blumenbach.* Voigt Magazin.
[4] *Dr Darwin.* Zoonomia, London, 1791, vol. ii. p. 229.
[5] *Sir J. Banks.* On Diseases in Corn.

tive were the gases given out from the lake Quilotoa, that whole herds of cattle on its shores were killed.'[1] In Saxony, during this and the next year, small-pox was very fatal in sheep, and inoculation was attempted by Fink.[2] Rabies canina was epizoötic in Rhode Island, North America.[3] In the kingdom of Wurtemberg anthrax was very severe, and people were frequently affected by transmission of the poison.[4]

In Bavaria, according to Wirth, there appeared an epizoöty among the horses; it was a putrid disease, accompanied by malignant quinsy and nervous fever; all the thoracic organs were involved.[5] It was probably the malady alluded to in 1795.

An extraordinary epizoöty among cats, remarkable not only for its prevalence in many countries, but also for the peculiarity of its origin and spread, is recorded for this year. It appears to have been developed in America about the same time as the epidemic yellow fever of the preceding year. Such may be inferred from Erdmann's account of it.[6]

'Shortly before the commencement of the yellow fever in 1798, there was a great disease among the rats and cats, from which many hundreds died. This was also the case here in Philadelphia before the breaking out of the yellow fever in the past year 1797, and in 1796 at New York. As far as we can learn, the symptoms of this disease have not been sufficiently observed. The animal, however, usually lost its appetite, but drank a great deal, slept much, looked very ill, and many began to grow emaciated. Some died in a kind of stupor; others, on the contrary, towards the termination of the disease, became mad, vomited, and foamed at the mouth. Also among the dogs, at the beginning of the yellow fever, there was a sickness of which many died. This disease among the domestic animals has often been observed to precede the breaking out of yellow fever, and now it is looked upon by many as a certain forerunner of

[1] *Humboldt.* Voyages, p. 317.
[2] *Fink.* Beschreibung der Pockenkrankheit, p. 22.
[3] New York Medical Repository. [4] *Wirth.* Op. cit., p. 86.
[5] Ibid. p. 136.
[6] With regard to the commencement of this feline epizoöty, however, we must not overlook Blumenbach's mention of a somewhat analogous, if not identical, malady in Holland, in the middle of 1796.

this epidemic, and this fact is adduced to favour the opinion of those who assert that it is not brought here by contagion, but is generated spontaneously. In the months of March and April, a remarkable disease appeared among cats in London and other parts of England, and it is said that in three parishes of London, within fourteen days, above five thousand died. This was probably the same disease which had raged among these animals in nearly all the towns of New England and New York in this year. It seems to have been confined to the towns, as nothing has been heard of it from the country. In France the same happened in this year, as we learn from the Bordeaux newspapers. As, however, in these years no yellow fever was present in any of these places, except Philadelphia, the opinion that that malady always follows the sickness in cats is seriously shaken.'[1] It was calculated that five thousand cats perished at Philadelphia, and four thousand at New York.[2] 'This cat distemper appeared in Philadelphia as early as June (1797), and proceeded northward and eastward, like the catarrh of 1789. In August it was very fatal in New York, and in the course of the summer and autumn, it spread destruction among those animals over the Northern States.'[3]

In London, the cat epizoöty manifested itself during the months of March and April, 1797. 'In England a pestilence among cats swept away those animals in thousands. It seems that this disease began as early as April, and succeeded an epidemic catarrh among the human race. The same cat-plague was soon after epidemic in France.'[4] In Ireland it was also observed. 'The feline race in this country are dying in numbers by a mere murrain similar to that which sometimes seizes and spreads among the black cattle; for some of the skins of the cats which died of the disorder now prevalent among them, being dried, and the hair taken off by lime, appeared full of small holes caused by numbers of worms or insects that thus penetrate; when seized with the distemper the poor animals appear to be in the greatest agony.'[5]

From the commencement to the end of September, seven

[1] *Erdmann.* Das Gelbe Fieber zu Philadelphia, &c., p. 10.
[2] New York Medical Repository, vol. i.
[3] *Webster.* Op. cit.
[4] Ibid.
[5] Hibernian Magazine.

thousand cats died of this epizoöty at Copenhagen.[1] In the next month, October, it was prevailing at Bordeaux.[2]

In Stockholm it was also observed in this year,[3] and in Lusatia in the month of December.[4]

In 1798 it showed itself in Holland,[5] and has been briefly described by Schelver, probably in the following year. 'The disease in cats, which has lately raged in so many countries of Europe, had also spread itself over the diocese of Osnaburgh and the neighbouring districts. For a year past it has now been gradually disappearing.'[6] At Lyons it does not appear to have manifested itself until 1798. 'An eruption of itch (*gale*) similar to that of 1762, has shown itself at Lyons among the cats, and has nearly destroyed them all.'[7] In Piedmont it was observed by Buniva in 1798;[8] and in the same year in Lombardy, by Brera, it was remarked in the summer months.[9] At Vienna, according to Penada, the disease killed more than twenty-five thousand cats; from this locality it spread by Carinthia and the Tyrol, into Friuli, Venice, and Padua, in which place Penada saw it in the spring of '98. It appears also to have extended to the Island of Zante, one of the Ionian Islands to the south of Cephalonia, in the Mediterreanean, as it was noticed there by Rhulière in this or the succeeding year.[10] The authority whom we have so often named—Heusinger—is of opinion that the dates of these various attacks may lead us to infer that the direction taken by this singular epizoöty was from the north-west to south-east; and the accounts of it by Caldwell, Erdmann, and others would permit of the hypothesis being received as at least plausible, that this malady was

[1] *Hundius.* Dissert. Morbi Epizoötici Felibus an. 1797 fatalis historia. Viteberg, 1800, p. 6.

[2] Journal de Santé de Bordeaux, vol. ii. p. 247.

[3] Electriska Kraftens märbärdige starka rörelse och verkan or 1797, äfoer anmärkd sosom förmodad orsak til Katta Slägtes besynnerliga Pest i Hufvudstaden. Stockholm, 1798.

[4] *Knebel.* Lausitzische Monatsschrift. März, 1799.

[5] *Seftström.* Ny Journal uti hushollningen. 1799.

[6] *Wiedemann.* Archiv. für Zoologie und Zootomie, vol. i.

[7] *Ozanam.* Hist. des Maladies Epid., vol. v. p. 371.

[8] *Buniva. Sellot.* Recueil pér. de la Société de Médecine, vol. vii. p. 273.

[9] *Brera.* Memoria sul attuale Epidemia dei Gatti. Pavia, 1798.

[10] *Hundius.* Op. cit.

developed among cats during the yellow fever, and that it had followed a route similar to that pursued by the distemper in dogs in 1761. The descriptions given by the various observers are very much alike, especially those of Brera and Buniva. The latter says, 'Citizen Dumas, professor of medicine at Montpellier, has rightly said that the symptoms of the disease are dullness, loathing, debility, rigidity of the members, drowsiness, frequent yawning, alteration of the voice, and trembling of the head and extremities. We may observe that in the succession and the nature of the symptoms there are great differences. Here are the results of our experiences in this matter. A few days after the animal has imbibed the contagious principle, it appears to be uneasy and unwell; it loses its vivacity and nimbleness, manifests no desire to seek for food, its winning graces are gone, and so is its courage. In proportion as the disease advances it becomes timid, melancholy, restless, and feeble; it evades its master, and drags itself along with slowness and difficulty; it withdraws to the most secret places in the house, and neither eats nor drinks with its accustomed avidity; its claws are less active and moveable; the *valeriana*, *marum*, and the *nepeta cataria* no longer excite it. Quickly the feebleness and the stupidity augment, and the creature becomes sleepy; it can scarcely maintain itself on its feet, the tail is drooping, the head bent down, and the neck looks as if longer than usual; the ears hang flaccid and are cold, the eye is diminished in size, sunken, and tearful, while the pupil is narrowly contracted; the tongue is dry, and covered with a yellow mucus; the mouth dribbles forth a frothy saliva of a whitish tint deepening down to green.

'In the commencement of the disease there are rarely any fæces passed; the respiration is laboured and very short, the pulse small, quick, and frequent; the heat of the skin is very intense. The animal becomes insensible to the voices of those who tend it. The belly becomes tympanitic; there are frequent tremblings and violent convulsions. An universal cold ensues, and the sick beast makes ineffectual efforts to vomit. Citizen Tuffet has nevertheless remarked that in the prison at Stapleton, near Bristol, England, in the month "germinal" of the year 7 (March, 1799), of twenty cats which were in that prison eight

perished from this disease, and two of these he particularly observed threw up, by repeated and severe retchings, a yellow fetid matter. The bodies of these animals, as death began to approach, assumed more and more of a yellowish tinge. (The epidemies in man, in America and elsewhere, at this time, were remarkable for their bilious complications.)

'Lastly, it was after this succession of symptoms that the cats affected by the epizoöty perished,—an event which ordinarily took place on the fourth or fifth day after being attacked. A personal remark we may here make is, that from the second day of the disease it was very difficult to draw any electric sparks from these animals by frictions on the back. The post-mortem examinations have revealed gangrenous patches in the whole of the viscera, but particularly in the stomach and intestines. The nostrils, the mouth, the œsophagus, the trachea, the lungs, and also the intestines, were full of a serous and mucus matter, which was sometimes white, sometimes yellow, and at other times blood-coloured. I shall not mention the many other alterations that I found after death in those I opened. Professor Hallé has found a purulent mass of matter at the base of the brain, near the ethmoid bone, and the gall-bladder very distended, in a cat which he opened. This disease has been observed in the department of the Lower Seine by citizen Cloquet; it has also reigned at Bordeaux, Strasburg, and other places.' 'The past year (1798), as I was walking through the forests in the neighbourhood of the menagerie of the National Vénerie (at Turin), I came upon the dead bodies of two wild cats which appeared to have died recently. So far as I could judge by the foam and saliva about their mouths, by the discharge from their noses, as well as from the alterations observable in their viscera, I was of opinion that they had been the victims of the same malady which had destroyed the domestic cats. My conjectures acquired yet greater probability after I had questioned a sportsman on the subject, for he assured me that the mortality was then very great among wild cats. The Society of Agriculture, and also that of Medicine at Paris, was informed that the epizoöty, which is the subject of this memoir, so far from having disappeared, had recommenced its ravages in some depart-

ments, and even in the cities. These societies have invited Professor Huzard to gather information on this subject, and to make any researches he may deem necessary. The Society of Medicine has likewise authorized the citizen Bouvier to pursue his investigations conjointly with M. Huzard. This epizoöty prevailed during last year in the Island of Zante. I am informed of this by citizen Rhulière, who was then intrusted with certain functions by the French Government at that place.'[1]

From the description afforded us by Hundius, it appears that vomiting was a most prominent symptom in a great many countries.[2]

Brera, in his post-mortem examinations, discovered that 'the cavity of the stomach did not show anything except a greenish mucus, which was also found along the whole course of the intestinal canal.'[3]

A disease in fowls in the United States is described by Dr Wiesenthal, Professor of Anatomy at Baltimore. He says: 'There is a disease prevalent among the gallinaceous poultry in this country called the *gapes*, which destroys eight-tenths of our fowls in many parts, and takes place in the greatest degree among young turkeys and chickens bred upon established farms. Chicks and poults, in a few days after they are hatched, are found frequently to open their mouths wide and gasp for breath, at the same time sneezing and attempting to swallow. At first the affection is slight, but gradually becomes more and more oppressive, and ultimately destroys. Very few recover; they languish, grow dispirited, droop, and die. It is generally known that these symptoms are occasioned by worms in the trachea. I have seen the whole windpipe completely filled with these worms, and have been astonished at the fowls being capable of respiration under such circumstances.'[4]

[1] *Buniva.* Op. cit., pp. 273, 286, 292.

[2] *Hundius.* Op. cit., p. 9. [3] *Brera.* Op. cit., p. 12.

[4] Since the days of Dr Wiesenthal, this worm or parasite has been receiving some attention. In scientific classification it has obtained the honourable title of *Sclerostoma Syngamus.* Dr Spencer Cobbold informs us that 'this parasite has been found and recorded as occurring in the trachea of the following birds, namely, the turkey, domestic cock, pheasant, partridge, common duck, lapwing, black

A.D. 1798. Catarrhs, anginas, and pleurisy were frequent in mankind. The epizoöty in horses, which has been remarked as prevalent in Bavaria and Franconia in 1795 and 1796, had extended in this year to Eastern and Western Prussia.[1] Glanders prevailed in an epizoötic form in Piedmont.[2]

Mr White, of Exeter, speaks of 'influenza' affecting horses in this year, but I have not the work containing his reference to hand at present. The epizoöty appears to have been attracting some attention, for two years previously Dr Darwin, in his philosophical treatise, 'Zoonomia,' devotes some space to its consideration, and designates it as a *contagious* disease, as we have already noticed for 1782.

A.D. 1799. The winter was cold, the summer humid. The former season had been very severe and destructive to cattle in Sweden. In the month of November appeared the influenza in man in Russia, which in January, 1800, had reached Prussia, and soon thereafter became epidemic throughout Europe. In Morocco, famine and pestilence arose, and were said to be due to elemental disturbance. Plague raged in mankind in that empire; and it was remarked that birds deserted their former abodes while it lasted.[3] Jackson says: 'Before the plague, in 1799, the face of the earth, from Mogador to Tangiers, was covered by locusts. The whole region, from the confines of the Sahara, was ravaged by them; but on the other side of the river El Kos not one of them was to be seen, though there was nothing to prevent their flying over it; till then they had proceeded northward, but on arriving at its banks they turned to the east, so that all the country north of El Araiché was full of pulse, fruits, and grain, exhibiting a most striking contrast to the desolation of the surrounding districts.'[4] In November and December of this year, and in the following year, an epizoöty of aphthous fever

stork, magpie, hooded crow, green woodpecker, starling, and swift. I do not doubt that this list might be very much extended if our British ornithologists would favour us with their experience in the matter. Hitherto I have been surprised to find how few of those to whom I have mentioned the subject appear to be acquainted either with the nature of the parasite, or with the various methods to be adopted in curing the disease to which its presence in the windpipe gives rise.'

[1] *Ammon.* Tennecker Zeitung, vol. iii. [2] *Toggia.* Op. cit.

[3] *Bascome.* Op. cit., p. 145. [4] *Jackson.* Travels in Morocco, p. 54.

(*ekzema epizoötica*—foot and mouth disease) manifested itself in Piedmont among cattle. 'This disease broke out so rapidly, that when one animal in a stable became affected, it was communicated with incredible rapidity to the whole of the cattle without distinction of race or sex, and no place escaped. It was accompanied by a slow fever, and at the same time there might be observed an eruption of pustules (*pustulette*) occupying the outer and inner surfaces of the lips, the fauces, palate, and especially the tongue, though more rarely the eruption appeared upon the udder. This eruption soon degenerated into ulcers, which were not long in healing up.'[1] From the month of January this epizoöty had been present in the Venetian States, and in Lombardy; but in these countries it appears to have been designated 'cancro-volante' (glossanthrax[2]). Not long after this the terrible Cattle Plague was introduced, and 'contemporaneously appeared an epizoöty which destroyed a great number of dogs, especially those of a sporting kind.'[3] In the same region sheep suffered much from small-pox.[4] With reference to the epizoöty among dogs, Chabert alludes to the great prevalence of canine distemper in and around Paris during this and the following year.[5]

In England, this year, a contagious disorder among horned cattle had broken out in the neighbourhood of Frostenden, Suffolk, which was believed to be the 'Cattle Plague,' as an Order in Council, dated April 25th, applied the provisions of the Order of 1747. All fairs and markets for cattle within ten miles were stopped, and compensation to half the value was offered for all animals slaughtered and buried to prevent the disease spreading.

In the county of Orkney, a most malignant and contagious distemper also broke out among cattle, particularly in the parish of Sandwich, and a similar Order to that already noticed was issued by the Privy Council on the 15th of January, 1800. We may remark that some of the later outbreaks of what was supposed to

[1] *Toggia.* Mal dei Buoi, vol. ii. p. 346.
[2] *Faggiani.* Topografia di Padova, p. 111.
[3] Ibid. p. 112.
[4] Ibid. p. 113.
[5] Op. cit.

be 'Cattle Plague' may have been other diseases. At any rate I can find no sufficient proof that these alarming eruptions were due to that malady; and it is not improbable that some of the local diseases, assuming a more virulent character than usual, may have been mistaken for this scourge of horned cattle.

THE END.

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